# Teachers College RECORD

December 1926

CONTENTS

Report of the Dean for the Year Ending June 30, 1926 335
Changing the Curriculum in Arithmetic *Clifford B. Upton* 341
Mathematics in the Junior High School *John R. Clark* 360
The Mathematics of the Senior High School *W. D. Reeve* 374
The Four Goals of Home Economics Teaching *David Snedden* 387
Budgetary Practice in Local School Systems *N. L. Engelhardt and Fred Engelhardt* 394
New Studies in Education . . . . . 413
College News . . . . . 419
*The Resignation of Dean Russell*
Alumni Activities . . . . . 430

BUREAU OF PUBLICATIONS
TEACHERS COLLEGE COLUMBIA UNIVERSITY
$2.50 a Year 30 Cents a Copy

# TEACHERS COLLEGE RECORD

VOL. XXVIII, No. 4 DECEMBER 1926



JAMES E. RUSSELL, *Editor*
Dean of Teachers College

CLYDE J. TIDWELL, *Managing Editor*
Director, Bureau of Publications



THE TEACHERS COLLEGE RECORD is issued ten times a year, monthly except July and August. The subscription price is $2.50 per year; foreign postage, 50 cents; Canadian postage, 30 cents. Single numbers are 30 cents each, postpaid.

Publication office, Federal and 19th Streets, Camden, N. J., and 525 West 120th Street, New York City. Editorial and general offices at the latter address.

NOTICE TO SUBSCRIBERS: Notify the TEACHERS COLLEGE RECORD promptly of any change of address; otherwise copies lost in transit will not be duplicated.

Entered as second class matter March 17, 1926, at Post Office at Camden, N. J. under the Act of March 3, 1879.



Copyright, 1926, by TEACHERS COLLEGE, Columbia University.



## WHAT ARITHMETIC SHALL WE TEACH

By GUY MITCHELL WILSON, Ph. D.

*The Scientific Spirit in the Field of Arithmetic*

THE aim of this book is to help superintendents and teachers assemble and interpret the scientific data now available as to what is useful in arithmetic. The author assumes that arithmetic in the grades is justified only on the basis of its utility in everyday life. As a result of his scientific investigations he concludes among other things that both too much arithmetic is taught, even in our modern progressive schools, and that many topics are introduced too early in our courses of study in arithmetic. The book will help in organizing for the schools the new and vital arithmetic demanded in the interests of a happy childhood and a more efficient adulthood.

In the Riverside Educational Monographs. *In press.*

**HOUGHTON MIFFLIN COMPANY**

*Boston* *New York* *Chicago* *San Francisco*

VOLUME XXVIII NUMBER 4

Teachers College
RECORD

December, 1926

# REPORT OF THE DEAN OF TEACHERS COLLEGE*

## For the Academic Year Ending June 30, 1926

To the Trustees of Teachers College

*Sirs:*

This year marks the end of an epoch in the history of Teachers College. The last class of young students has been graduated. Hereafter we shall have only mature students, all of them graduates of colleges, technical schools, or normal schools with experience in teaching. It is the outcome of a tendency dating back some thirty years. In 1897-1898 the college enrollment was 69 matriculated students, all young girls, most of them preparing for teaching in kindergarten and elementary schools. In 1907-1908 the offering was restricted to professional students, of whom 262 were college graduates out of a total enrollment of 896. Ten years later, in 1917-1918, the number had increased to 2,385, of whom 773 were college graduates. In 1925-1926 the attendance was 4,909, of whom 2,471 were college graduates and 1,249 graduates of normal or technical schools, with at least two years of experience in teaching.

This change in student personnel has been accompanied by a corresponding change in the content of instruction and in methods of teaching. The only opportunity open to the young student is classroom teaching. The experienced teacher who seeks further training looks forward to a different type of service. He may still be a classroom teacher, but he takes on extra duties, such as head

* From the bulletin comprising the report of the Dean and the reports of the Directors of the several Schools, Institutes, and administrative departments of the College, for the year ending June 30, 1926.

of department in charge of other teachers. Some become superintendents of schools, supervisors, principals, and teachers of teachers in normal schools, colleges, and universities. During the past few years our Bureau of Educational Service reports that the largest number of appointments of graduate students has been in colleges and universities. At the same time, the number of appointments to the lower schools, while relatively smaller, is absolutely larger than when we were giving our entire attention to teaching in the lower schools.

The problem of professional training confronting Teachers College is peculiar. No other professional school meets a similar situation. The schools of law, medicine, and engineering deal with young students or with students who have had no professional experience. Their aim is to give their students the necessary equipment for reaching the first round of the professional ladder. The next steps, and many steps thereafter, are taken under the personal supervision of a master—in a law office, in a hospital, or in the field, where no mistake is tolerated and where every error is corrected. The normal schools for teachers deal with novices as do the schools of law, medicine, and engineering. Their aim is to equip their students for professional service in teaching, but in the teaching profession there is no provision for apprentice-training under the eye of a master. The young teacher must stand alone from his first day in service; he works behind closed doors and with children who are obliged to accept his ministrations whether they are benefited or not. Much of the obloquy directed to the teaching profession can easily be traced to the faulty practice of beginners who learn their trade by experimenting upon helpless pupils. Years afterward these same pupils render their judgment of a teacher's worth when they are called upon to vote for a revision of a teachers' salary scale. He is a rare citizen who, remembering the faults of his own teachers, can nevertheless give approval to the theory that better pay will bring better teachers, and that better teaching is worth increasingly better support.

The inefficient teacher presents the most serious problem in educational administration. The problems of business management of schools and school systems, the provision for buildings and equipment and the securing of financial support, are sometimes perplexing, often

difficult, but seldom insoluble. Inefficient teachers, however, including all beginners and many who have grown old in the office, present a problem that cannot be resolved into quantitative factors or treated as a business transaction. The dismissal of incompetents gives no assurance that their places can be any better filled. The ordinary turnover due to death and withdrawal subjects every group to the pains of assimilation of newcomers. The best in any group seek outlets for promotion, the poorest fall by the wayside, those just too good to be dismissed and too poor to find positions elsewhere stay on. This trend to mediocrity confronts every educational institution from the kindergarten to the university. It is the one problem in educational administration that is omnipresent; it is rooted in the weaknesses of human nature, and expands under the complacency of public indifference.

The leaders in public education the country over are facing this situation with increasing courage. The rank and file of teachers appreciate their needs. The attendance on summer schools is an eloquent tribute to their desire to help themselves. But no amount of formal instruction in normal schools or teachers' colleges can offset the disadvantage under which our profession suffers by not having a period of apprentice training comparable to that which obtains in law, medicine, and engineering. As long as young teachers are left to their own devices, so long will bad habits crop up which can never be eradicated by merely being talked about. If a mistake in teaching were regarded as seriously as is an error in a legal brief or in an engineering computation, we should have teachers as careful of their prescriptions as physicians are. The fault is not with the teacher but with the system under which he works. My belief is that in the pedagogical millennium every school and school system will accept one novice for every ten teachers in service. These novices will be given some teaching to do—say, half-time service for half pay—but whatever they do will be done under the eye of a master who will be responsible for the inculcation of right habits. Those who measure up to acceptable standards will be assured of permanent positions; those who fall short will be spared a life of misery in an occupation for which they are not fitted. The result in either case must be to the lasting advantage of the pupils in our schools, and indirectly to the profession as a whole. Nor would I exclude our highest

institutions from this privilege. Our colleges and universities suffer as much from professional malnutrition as do our public schools. All alike tend to mediocrity, because there is at present no systematic means of preventing the accession of the unfit, or of developing the powers of those most competent. The excuse generally offered for failure to use such obvious means of betterment is lack of funds. But it would seem to me that no expenditure could be so easily defended, and that no argument would have greater appeal to common sense. The greatest obstacle, I am convinced, lies within the profession itself. It tends to become static because it accepts the dictum that what has been will be, despite the visions of reformers. But once get the vision of a school in which all the teachers are as good as the best are now—an ideal not beyond the range of realization—then reformers look like practical schoolmen.

Teachers College is a school for reformers. Our objective lies a generation ahead. The attainment of our ideal would be relatively easy were we living in an unchanging world. The fact is, however, that educational procedure lags far behind the needs of the present, to say nothing of what the future will demand. The presence of students dissatisfied with themselves but eager for guidance is a standing challenge to our best efforts. These students of ours and their students in turn will soon be installed in the strategic positions of our profession. No professional school has ever faced a more difficult problem, and none has ever been given so great an opportunity for service. We cannot, and we would not, avoid the responsibility that the situation imposes.

The trend toward mediocrity is no less a danger in Teachers College than in other educational institutions, and for exactly the same reasons. While we have been exceptionally fortunate in retaining the ablest members of our staff, and have made few mistakes in the choice of newcomers, there is always the probability that routine will wear out the springs of individual initiative and that habit will check personal progress. The greatest danger of all is that we may rest content with our present grade of accomplishment. My conviction is that we are just now entering upon a new epoch in our history—one that promises greater rewards than we have ever enjoyed, provided we can bring to it the professional acumen and the enthusiastic devotion that the future demands. In particular, we

must devise a more systematic method of training the young instructors in the College and the young teachers in our schools. We cannot afford to let them grow up with only the casual guidance that hard-working superiors can give. The unity of the institution, now branching out into many departments, some of which are larger than the College itself was twenty-five years ago, as well as the harmonious development of our professional service, must be preserved in spite of the urge to group specialization.

Our first task, therefore, is to cast the beam out of our own eye; then we shall see more clearly how to improve the vision of our students. They are, as I have said, destined to become directly or indirectly leaders of teachers. We must see to it that those who specialize in administration do not make a fetish of organization and finance and construction and equipment; that principals and supervisors become something more than business managers; that experts in research and in tests and measurements regard themselves as servants in the house rather than as masters of the domain. The more efficient the training of these specialists, the nearer will be the approach to the classroom teacher. The tendency, however, of the specialist in any field is to magnify the subject, perfect its organization, systematize its content, and extend its range. It becomes an end in itself. In a professional school there can be but one end, and that end is defined by the needs of practitioners. Specialization is justified only to the extent that it serves this end.

In the growth of Teachers College it is inevitable that specialization should come. There are some sixty-five different groups of students recognized in the award of diplomas. To meet the needs of these groups, not to mention individual differences within the groups, our instruction must be specialized in high degree. Our problem is to maintain this specialization on the highest plane of scholarship consistent with the objectives of our students when reckoned in terms of both the near and the more distant future. The solution is not likely to be reached by too much deference to the pressure of popular fads nor by over-emphasis of departmental erudition. In the guidance of both students and instructors, there is need of abundant common sense—a sense that is akin to a far-seeing philosophy of education.

A statement of the policy that I think we should pursue is simple

enough; its execution is quite another matter. First of all, it demands a much larger faculty than we have at present. No other school that I know of carries so large a registration with so small a faculty. A larger faculty bespeaks in turn better provision than we have ever made for the assimilation of newcomers, and it means also better guidance than we have ever given to the work of the institution as a whole. To get the best that instructors can give requires suitable equipment and facilities for their work. With nearly five thousand college students and upward of nine hundred school pupils housed on less than a city block, it must be apparent that elbow-room is at a premium. More instructors, more space and more equipment on the one hand, or fewer students with less diverse interests on the other hand, might suggest a remedy. But 91 per cent of our current expenses, aside from funds donated for research and special purposes, comes from students' fees. Fewer students, less income; more instructors, more expense. In any case, the welfare of the College requires that our endowment be greatly increased. At present the income from vested funds for current expenses does not suffice to maintain the plant the year round. But for what we have I am profoundly thankful, because I know at what sacrifice it has been given. Our Trustees have been more than generous, but no group so small should be expected to carry a load that belongs to the public at large. There must be somewhere public-spirited citizens who would be glad to share the burden and participate in its rewards. In a final analysis, we need more friends who are willing to invest in an enterprise that promises dividends in the form of better citizens in the on-coming generations. I have confidence in the faculties of Teachers College that they will rise to the occasion and make such an investment a blessing both to those who give and to those who receive. The loyalty of our graduates and the whole-hearted devotion of every member of our staff are the best possible guarantees of still greater professional service in the cause of public education.

Respectfully submitted,

JAMES E. RUSSELL,

*Dean*

*June 30, 1926*

# CHANGING THE CURRICULUM IN ARITHMETIC

## With Provision for Individual Differences of Pupils

By CLIFFORD B. UPTON

*Associate Professor of Mathematics, Teachers College*

IN THESE days of the scientific study of school curricula, we discover that many topics in arithmetic have gained or lost in importance because of recent social and industrial developments. The subject matter of arithmetic is always undergoing change and what may have been an essential topic of instruction twenty-five years ago may to-day be relatively unessential. Not only are the practices in computing being modified from time to time, but the applications of arithmetic to the world about us have enormously increased on account of the growth of science and industry. Hence it becomes necessary to determine as carefully as possible what knowledge of arithmetic is really essential to serve the needs of everyday life.

The problem is further complicated when we attempt to find the minimum group of topics to be prescribed for pupils below average ability in those school systems where pupils are classified in three groups, known as the slow or Z pupils, the average or Y pupils, and the superior or X pupils.[1] This article presents a brief survey of the changes that have taken place in certain topics in arithmetic during the past quarter of a century and suggests how much of each of these topics should be prescribed for the different groups of children.

### FUNDAMENTAL OPERATIONS WITH WHOLE NUMBERS

During the past few years a number of investigations have been made by Charters, Mitchell, Wilson, Wise, Woody, and others in an attempt to find the kind of arithmetic actually needed in the social

[1] This system of classification is now successfully used in a number of school systems. In Detroit, for example, all children entering the first grade are given an intelligence test; the 20 per cent who rate highest make up the X group; the middle 60 per cent constitute the Y group, and the lowest 20 per cent the Z group. Each group has a curriculum modified to suit its needs; for example, the Z's are given only the basic essentials in the simplest form, and they progress more slowly than the Y and X groups.

and business activities of adults. Collectively these studies include a careful analysis of over 15,000 sales checks and bills as found in hardware, grocery, and department stores; a standard cook book; typical pay rolls; discount sales advertised in newspapers; and over 20,000 problems actually reported as occurring in the daily lives of men and women representing over 150 different occupations. The results of these studies show that the problems in everyday life which involve the fundamental operations with whole numbers are rarely more elaborate, and in many cases are much simpler, than those given below.

| Addition | Subtraction | Multiplication | Division |
|---|---|---|---|
| $125.16 | | | |
| 73.45 | | | |
| 2.59 | 8915 | 326 | |
| 287.94 | 3675 | 74 | 45)1215 |
| 58.11 | | | |
| 65.50 | | | |

*Topics for Each Group.* In view of these facts pupils in the slow or Z group should become proficient in working problems of the difficulty above illustrated, and not waste considerable energy on harder examples. Naturally pupils of the Y and X groups will be expected to be skillful in adding longer columns and in doing more elaborate work in subtraction, multiplication, and division.

It has also been found that problems in division are of relatively infrequent occurrence compared with those involving the other operations. Hence there is not the same pressure for speed in this operation that there is in addition or multiplication. Consequently for Z pupils whose ability is considerably below average the question has been raised by one of our leading state supervisors whether or not short division should be taught at all, his suggestion being that the long division process be used for one-figure as well as for other divisors. This suggestion is worthy of careful consideration in certain cases. However, since much of the division that normal adults have to do is of a kind that can be done mentally, such as finding ¼ of 69¢, it does seem desirable to retain the short division process for Z pupils if possible, since short division exercises those skills that give the ability to divide mentally. For the average and superior groups short division will of course be prescribed.

## COMMON FRACTIONS

The subject of common fractions has undergone more change in the past twenty-five years than any other topic in arithmetic. Whereas a quarter of a century ago it was a frequent occurrence to ask pupils to add a series of fractions like $\frac{2}{3} + \frac{3}{5} + \frac{7}{8} + \frac{5}{12}$, to-day such a problem is regarded as impractical and extreme. Over 94 per cent of the common fractions found in present-day life are those whose denominators are 2, 3, 4, 5, 6, 8, 10, 100, and sometimes 12, but when it comes to genuinely practical problems in the addition and subtraction of fractions we find that our range of denominators is still more limited. For example, there is frequent need for the addition of halves, fourths, and eighths, as is seen in the following:

Helen's mother bought 2 ducks for the Thanksgiving dinner. One weighed $6\frac{1}{2}$ lb., the other weighed $5\frac{3}{4}$ lb. What was the weight of both?

John weighed $66\frac{3}{4}$ lb. in May and 73 lb. in October. How many pounds did he gain?

Margaret needs $2\frac{1}{4}$ yd. of cloth for one dress and $2\frac{3}{8}$ yd. of the same cloth for another. How many yards should she buy?

It is extremely difficult, however, to find satisfactory problems where we are actually obliged to add halves and thirds, or fourths and sixths, or fractions having any other denominators than 2, 4, 8, or 16. The following, selected from the best problems found in modern textbooks, illustrate this difficulty:

David worked $1\frac{1}{3}$ hr. after school on Monday, $\frac{5}{6}$ hr. on Tuesday, $1\frac{1}{6}$ hr. on Wednesday, $\frac{2}{3}$ hr. on Thursday, and $1\frac{1}{6}$ hr. on Friday. Find the total number of hours David worked.

Of all the cotton produced in the United States in a certain year, Georgia produced $\frac{1}{6}$, South Carolina $\frac{1}{8}$, and Texas $\frac{1}{4}$. What part of the total crop was produced by these states?

George was $5\frac{1}{12}$ ft. tall. His sister was $4\frac{1}{3}$ ft. tall. How much shorter was his sister?

Of the three problems in the above group the first is evidently artificial since a boy would record his working time in terms of hours and minutes and not as $1\frac{1}{3}$ hours or $\frac{5}{6}$ of an hour. The second problem, relating to the production of cotton, is also artificial since the production in Georgia is not exactly $\frac{1}{6}$, nor that of Texas exactly

¼ of the total production. Statistics comparing the growth of cotton in the various states are actually given in terms of per cents. The third problem expresses the heights of the children in terms of a fraction of a foot, whereas we would naturally compare the heights by expressing both in feet and inches or in inches alone.

Since our actual needs in the addition and subtraction of fractions are confined, therefore, to simple problems like $\frac{3}{8} + \frac{5}{16}$, or $2\frac{3}{4} - 1\frac{1}{8}$, we are immediately relieved of the teaching of a number of topics which formerly caused more or less trouble to pupils. Formal instruction in least common denominator, greatest common divisor, and least common multiple is no longer necessary, and these expressions themselves need not even be mentioned. In adding fractions like $\frac{1}{2} + \frac{5}{8}$, or even in adding $\frac{5}{6} + \frac{3}{4}$, the common denominator is readily found by inspection and it isn't serious if the common denominator found in this way is not the least common denominator. For example, in adding $\frac{5}{6} + \frac{3}{4}$, while it is desirable to see that the least common denominator is 12, we should not feel disturbed if the child changes each of these fractions to twenty-fourths.

In view of our limited need for the addition of common fractions there seems to be little excuse for continuing to teach frameworks, such as the one shown at the right, for facilitating the addition of such fractions. It is surprising how often one finds such frameworks used in the classroom and it is still more surprising that two of the more recent and most valuable courses of study in arithmetic, prepared under the direction of curriculum specialists, are continuing to prescribe such frameworks in the fifth grade work for the addition of fractions. Those who use such frameworks are tacitly assuming that the fractions to be added will have such a variety of denominators as to make it desirable to have some mechanical means of facilitating the work of changing the fractions to those having a common denominator, and they are likewise hoping to save time in the solution of such examples. My answer to this assumption would be that if the fractions are such as to make a framework a convenience, then they are fractions which are not used in everyday life. There is the additional objection to the framework that it tends to form bonds which are undesirable, leading the child to

| | 12 |
|---|---|
| 2 3/4 | 9 |
| 5 1/6 | 2 |
| 4 2/3 | 8 |
| 12 7/12 | $\frac{19}{12} = 1\frac{7}{12}$ |

associate the fraction ¾ in the above illustration with the number 9 placed at its right. We do not want ¾ associated with 9 but we do desire ¾ to be associated with 9/12. In doing an example, such as that on the preceding page, it is far better to arrange the work as shown at the right. For all groups of students, therefore, the teaching of such frameworks should be abandoned.

2 3/4 = 2 9/12
5 1/6 = 5 2/12
4 2/3 = 4 8/12

In the multiplication of fractions the main practical need is that of finding a fractional part of a whole number, such as finding the cost of ¾ lb. of butter at 64¢ a pound. This also includes the multiplication of a whole number by a mixed number, such as 2¾ × 70¢. There is also need for multiplying a mixed number or a fraction by a whole number, as in finding the number of yards needed to make 5 dresses if 1 dress requires 2¾ yards. We also have occasion to use such concepts as ½ of ½ yd. = ¼ yd., or ½ of ¼ yd. = ⅛ yd.; this work would technically be called the multiplication of a fraction by a fraction but for practical purposes one does not need to know anything about the multiplication of a fraction by a fraction in order to get these concepts. How little real need there is for the multiplication of a fraction by a fraction, such as ¾ × ⅝, is shown by the following struggles of the school textbooks to find suitable applications of this work:

A hair ribbon requires 1¼ yd. of ribbon, a sash 2½ times as much. How many yards of ribbon are required for the sash?

If George worked ⅝ of an hour and Will worked ⅖ as long as George, what part of an hour did Will work?

Alice has ¾ of a pound of sugar. If she used ⅔ of it for making fudge, what part of a pound did she use?

Some one will insist, of course, that there is a real need for the multiplication of a mixed number by a mixed number, and will cite as an illustration the necessity of finding a man's wages for 12¾ hours if he receives 62½¢ an hour. I will grant that this problem could occur, but it is not likely to disturb seriously the life of the slow pupil belonging to the Z group. If as a workman he is ever involved in such a situation his employer will work it for him. Moreover, the computation can easily be made by decimals without any multiplication of fractions.

The case for the division of fractions is still less favorable. The

following problems taken from current textbooks illustrate how difficult it is to find problems whose solution really requires the division of fractions:

If Maude has 1½ yd. of ribbon which she divides into 4 equal parts, how long will each part be?

How many pieces of cord each ¾ yd. long can be cut from 12 yd.?

It takes 1⅝ yd. of cretonne to make a cushion. How many cushions can be made from 6½ yd. of cretonne?

If your father uses 12½ tons of coal in 5½ months to heat your home, what is the average amount used per month?

Of these four examples, the first may be worked by changing the yards to inches; thus the division of fractions is avoided. The second problem, if it should occur in life, would probably mean that 12 yd. of cord are on hand. It would be solved by measuring off ¾ yd. from one end of the cord and then seeing how many times this length is contained in the 12 yd. Similarly, problem 3 assumes that a 6½-yd. piece of cretonne is actually on hand, and is worked by folding the length of the material into 1⅝-yd. lengths. In the fourth problem the ability to divide fractions would be an advantage, but the use of decimals is all that is needed. Thus we see that, although there is an occasional use for the division of fractions, this subject need not be taught to the Z pupils.

*Topics for Each Group.* In view of the above considerations, the following work is suggested for the three groups of pupils:

For the slow or Z group the addition and subtraction of fractions will be confined to halves, fourths, eighths, and at most sixteenths. The multiplication of fractions will be limited to the multiplication of a whole number by a fraction or by a mixed number, or of a fraction or a mixed number by a whole number; and to such concepts as ½ of ½ = ¼, ½ of ¼ = ⅛, ½ of ⅛ = 1/16. Omit entirely the multiplication of a fraction by a fraction or a mixed number by a mixed number. Also omit all of the division of fractions.

For the average or Y group teach also the addition and subtraction of such fractions as ½ + ⅔, ⅗ + 1/10, ⅚ − ¾, where the common denominator is easily found by inspection. Include the simpler cases of the multiplication of a fraction by a fraction. Also include the division of a fraction by a whole number; a whole number by a fraction; and a fraction by a fraction.

For the superior or X group increase the work on the addition and subtraction of fractions to include those examples requiring a certain amount of skill in finding the least common denominator. In the multiplication and division of fractions include those cases involving the more difficult situations in cancellation.

### DECIMALS

The world was slow in inventing the decimal fraction. Our Hindu-Arabic system of writing numbers, in which the distinguishing feature is the place value of figures, was perfected about 600 A.D. Although the decimal fraction merely extends the notion of place value to the right of the decimal point, it was not devised until nine hundred years later, and was not freely used until about 1800.

Within the last hundred years decimal fractions have been gradually taking the place of common fractions. In fact, the decimal fraction is really the common fraction of the life of to-day. This growth in the use of decimals is not only the result of the greater compactness and convenience of the decimal notation but also of the world's need for greater precision in measuring. There was a time when measurements correct to the nearest 32nd or 64th of an inch were sufficient in the factory and machine shop, but in this age of perfectly running motors, calculating machines, and typewriters, parts are so delicately fitted that their dimensions must be accurate within a thousandth or ten-thousandth of an inch. For these more delicate measurements it is far more convenient if the denominator of our fraction is 1,000 or 10,000.

This decimal division of the inch is not confined to the work of the expert mechanic. It is now assumed that it will be understood by the average individual; a striking illustration of this fact is found in the catalogs of the large mail order houses, whose combined distribution reaches almost half the population of the United States. In these catalogs one wishing to order a piston or a piston ring for his automobile motor must be able to interpret such descriptions as ".0025 oversize," ".005 oversize," ".010 oversize," or if he is ordering a set of balloon tires he will find the sizes described in decimal parts of an inch, as shown in the table at the right.

| Catalog No. | Size, Inches |
|---|---|
| 23944 | 29 x 4.40 |
| 23049 | 29 x 4.95 |
| 23149 | 30 x 4.95 |
| 23052 | 31 x 4.95 |
| 23152 | 30 x 5.25 |
| 23153 | 31 x 5.25 |
| 23057 | 30 x 5.77 |

A further illustration of the popular use of the decimal in relation to inches is found in the daily weather report in the newspapers. This gives, in 100ths of an inch, the rainfall in the leading cities during the preceding twenty-four hours. A specimen of such a report is shown at the right.

| | Rainfall Inches |
|---|---|
| Buffalo | .10 |
| Chicago | .48 |
| Denver | .00 |
| New York | .25 |
| Pittsburgh | .00 |
| Portland, Me. | .16 |
| San Antonio | .48 |
| Seattle | .28 |
| Washington, D. C. | .88 |

Similarly, in modern surveying, land is no longer measured by the rod but by the foot, which is divided into 10ths and 100ths instead of into inches. The convenience of dividing the mile into 10ths, rather than into halves and quarters, is illustrated on the speedometer of the modern automobile; the guidebook for motorists also designates distances correct to 10ths of a mile, as illustrated at the right.

Detroit to Port Huron

| Miles from Detroit | | Miles from Port Huron |
|---|---|---|
| 0.0 | Detroit | 57.0 |
| 11.3 | Roseville | 45.7 |
| 19.5 | Mt. Clemens | 37.5 |
| 24.6 | Chesterfield | 32.4 |
| 35.1 | Richmond | 21.9 |
| 52.3 | Marysville | 4.7 |
| 57.0 | Port Huron | 0.0 |

The correct use of the clinical or fever thermometer, which is now almost a household necessity, depends upon the ability to read degrees of temperature which are divided into tenths. It is of interest that the normal temperature of the body is usually memorized as 98.6° and not as 98⅖°.

The decimal is also rapidly gaining ground on the modern dairy farm. For some time it has been the practice to describe the amount of butter fat in milk as a certain per cent, such as 4.7 per cent. The modern dairy scale used to weigh milk no longer has the pound divided into ounces; to-day these scales are so graduated that the pound is divided into tenths, which enormously facilitates the convenience of keeping a record of a given cow's production, and also increases the accuracy of the record. These scales are now so generally used that they are described in the catalogs of the large mail order houses. Certainly articles sold in large quantities by the mail order system are not going to be marked decimally unless the people want them so.

The decimal division of the pound is also being found on health scales in schools and medical centers. In keeping records, it is easier to enter a child's weight as 37.3 lb. than as 37 lb. 5 oz.

Every baseball fan is obliged to interpret three-place and sometimes four-place decimals in order to determine the standing of the various players and teams. A specimen baseball record is given at the right.

National League

| | Won | Lost | P.C. |
|---|---|---|---|
| St. Louis | 89 | 65 | .578 |
| Cincinnati | 87 | 67 | .565 |
| Pittsburgh | 84 | 69 | .549 |
| Chicago | 82 | 72 | .532 |
| New York | 74 | 77 | .490 |
| Brooklyn | 71 | 82 | .464 |
| Boston | 66 | 86 | .434 |
| Philadelphia | 58 | 93 | .384 |

Another use of decimals in athletics is on the stop watch, where the seconds are now often divided into tenths to give greater accuracy in timing contestants.

From the above illustrations it is evident that each day the decimal is playing a greater part in our everyday life in spite of the fact that the metric system is not in general use in this country. Since we do not have the metric system we were forced to divide our own units, the inch, the foot, the mile, and the pound, decimally to gain greater convenience and accuracy. Possibly this is one way of bringing us closer to the adoption of the metric system itself and should we reach that goal many of the common fractions now currently found will rapidly disappear.

So far as school instruction in arithmetic is concerned the decimal should be sufficiently taught even to the slow or Z group. A well known supervisor of mathematics recently made the statement that because of the great prominence of common fractions in our books and the relatively short contact with decimals it is hard to find a person who is "decimally minded." By this he meant that, because decimals are emphasized so little in the schools, the expression 6.3 is not so readily understood as the expression $6\frac{3}{10}$. This fact should be borne in mind by those who are attempting to revise the curriculum. The work in decimals should offer an abundance of concrete illustration covering all of the phases of life where decimals are used, with constant opportunity to interpret decimals as well as to compute with them. In fact, one of the tasks the teacher has from the fifth grade on is that of teaching pupils to understand quantitative expressions which they find in newspapers and magazines. Many of the illustrations, noted above, of the present-day uses of decimals require very little in the way of computation on the part of any of us, but they do require an appreciation of the meaning of decimal expressions.

*Topics for Each Group.* With the above considerations in mind the following work in decimals is suggested for the course of study:

For the Z pupils there should be an unusual amount of practice in using and interpreting decimals, such as in reading a clinical thermometer, making drawings with a ruler divided decimally, reading the weather reports, looking up automobile supply catalogs, reading the sporting news, etc. The computations with decimals for the Z group should be limited to the following:

(1) The addition and subtraction of 1-, 2-, and 3-place decimals with the same number of decimal places.

(2) The changing of simple fractions like ¼ and ⅓ to decimals, and vice versa.

(3) The multiplication of decimals with 1 or 2 decimal places in the multiplier.

(4) The division of decimals with 1 or 2 decimal places in the divisor, the quotient being carried to a required number of decimal places.

The above topics should be reviewed as often and in as varied forms as possible. Because of the reduction of the work in common fractions for the Z group, it will be possible to spread the instruction in decimals over a period of two or more years instead of leaving it, as is now done in many schools, to a single year.

For both the Y and X groups the addition of decimals with a varying number of decimal places should be given since this case actually does occur in the use of an interest table, or in adding fractions on an adding machine by first reducing them to decimals, as shown at the right. Such addition examples are not real, however, if they are supposed to represent measurements, since it is the practice in life in a given situation to do all measuring with the same degree of accuracy and hence to the same number of decimal places.

$$\begin{array}{rl} 7\ 3/4 = & 7.75 \\ 4\ 1/2 = & 4.5 \\ 6\ 1/8 = & \underline{6.125} \\ & 18.375 = 18\ 3/8 \end{array}$$

In the multiplication of decimals, multipliers like .003 or .002½ may be introduced. The changing of common fractions to incomplete decimals, such as changing 5/7 to .714⅔, will also be an appropriate topic. Practice in giving approximate solutions and a discussion of the advantages of using decimals in place of common fractions in certain types of problems may also be included.

For the X group it is suggested that in the multiplication and division of decimals a study be made of the number of decimal places to which it is desirable to carry results. The metric system may also be included as an application of decimals.

### LIFE INSURANCE

Within the past fifteen years the buying of life insurance has rapidly become a habit with the American people and since such a habit is one of fundamental importance let us hope that it will never be broken. In 1910 the total amount of legal reserve life insurance in force in this country was about $15,000,000,000, but since then it has grown fivefold so that to-day the lives of the people of this country are protected to the extent of over $75,000,000,000. This figure is so enormous that it is almost impossible for us to grasp its significance. We begin to appreciate a little the size of this sum when we learn that it is almost one-fourth of the total national wealth of the United States. Reliable life insurance officials tell us that one-half of the entire population of the United States (men, women, and children) is now insured by some form of dependable legal reserve life insurance.[2] Since most persons carry life insurance to protect their families as well as to provide themselves with certain advantages, it is probable that the greater part of the remaining half of the population is protected either directly or indirectly by this insurance. Hence "it is safe to assume that a large majority of the 117,000,000 people in this country have a contractual relationship with a life insurance company, either as policyholders or as beneficiaries."

Twenty-five years ago life insurance was rarely mentioned in our courses of study. To-day it is a prescribed topic in most of our better schools, but the treatment is still comparatively brief and seems hardly commensurate with the importance of this topic. Subjects like the mensuration of the triangle, parallelogram, circle, cylinder, etc., which directly affect the lives of less than one out of fifty persons, are still given five times as much attention as life insurance with which the majority of our population is concerned.

Some people will argue that there isn't much arithmetic to life insurance, that it is merely a table of premium rates, and that there

[2] This does not include the assessment insurance or death benefit provided by fraternal organizations, which are not obligated by law to build up a reserve fund to protect their policies.

is little or no computation for a child to do. Granting this argument for the moment, we find it is based on the assumption that arithmetic is to be concerned with nothing but computation, whereas it is important for us to realize more and more, particularly in the upper grades of the elementary school, that it is as much the function of arithmetic to give a sound understanding of a fundamental institution like life insurance as it is to teach long division or percentage. It is only through a proper presentation of the arithmetic underlying life insurance that we really come to have a respect for this great force.

*Topics for Each Group.* It seems desirable, therefore, that life insurance should be given far more attention in the curriculum than it now receives. The recommendations for this work would be along the following lines:

For the Z group we should give substantially what is now in the textbooks; namely, a description of the usual types of policies with the rates, together with examples of how life insurance has relieved distress, provided education for children, and protected old age. We should assure these pupils that life insurance is absolutely safe.

For the Y group we may add information concerning the reserve fund which helps to make life insurance a 100 per cent safe investment. Also show how this reserve fund provides loan values and extended insurance in case of emergency. Life insurance dividends should also be explained.

For the X group there may be included a study of compound interest as a factor in building up the life insurance reserve, together with a brief description of the mortality table upon which premium rates are based. The reasons why the assessment form of insurance often fails, because of the lack of a reserve fund, may also be given.

## BUILDING AND LOAN ASSOCIATIONS

Another institution that has rapidly made a place for itself among our people is the building and loan association.[3] To-day there are over 12,000 such associations in the United States, representing more than 10,000,000 members. Since each member usually represents a family of several people we may safely say that the interests

[3] In certain states building and loan associations are called savings and loan associations, building associations, building and savings associations, coöperative banks (used in Massachusetts), or homestead associations (used in Louisiana).

of from one-fourth to one-third of the population of the United States are directly concerned with the operation of such building and loan associations. The growth of these associations, like that of life insurance, has been particularly rapid in recent years. Fifteen years ago the resources of these companies were about $800,000,000. To-day they exceed $4,000,000,000, a sum which is two-thirds as large as the total deposits of all the savings banks of the United States.

*Topics for Each Group.* Instruction concerning the building and loan association now seems a suitable topic in the arithmetic classes of the eighth grade. The work might be distributed as follows:

For the Z group there should be a simple explanation of the method of making a loan for the purpose of building a house and of the arrangements for membership in the association which require regular weekly or monthly payments that systematically cancel this loan. The savings division of the association should also be explained.

For the X and Y groups, in addition to the above, we may compare the method of borrowing money through a building and loan association with other current methods. We may also compare the building and loan association, as a place for saving money, with other opportunities for investing, such as the savings bank and stocks and bonds.

## INSTALLMENT BUYING

The buying of both necessities and luxuries on the installment plan has increased greatly in this country during the past few years. In 1925 retail sales in the United States, according to the Department of Commerce, amounted to $37,000,000,000. Of this amount it is conservatively estimated that $5,000,000,000 represented purchases made on the installment plan. This means that nearly one-seventh of all the retail buying during the past year was done on some form of partial-payment plan. Our newspapers are filled with advertisements suggesting that almost any article may be bought on time and the masses are being led to believe that credit is theirs for the asking and that they can acquire any object they want so long as they mortgage their future earning power for it.

There is certainly a great advantage in being able to buy an

absolutely necessary article on the installment plan if we cannot possibly pay cash for it. But unthrifty persons, who will not save enough money in order to pay cash for what they desire, are often led into paying exorbitant prices when they sign a contract which gives them the privilege of buying an article by making weekly or monthly payments. The whole system of deferred-payment buying has recently developed to such an extent that the leading merchants' and bankers' associations of this country are beginning to weigh the future results with concern. Should we have a period of depression in which many people are thrown out of employment and are unable to complete their payments, the real test of this system of selling will come. Meanwhile, the masses of the people must be taught, through the schools, what installment buying actually means *so far as the cost to them is concerned.*

We all realize that an article can be sold for cash more reasonably than it can be sold on time because the business house selling on installments is obliged to have a careful system of bookkeeping, to make special provision for payments which are not made on time, and to have a margin of safety to provide for those installment contracts which never mature due to default on the part of the purchaser. All these items cost money and someone must pay for them; in this case that someone is the installment buyer himself.

Let us take a simple illustration to show what buying on the installment plan really means to the purchaser. Suppose a radio set may be purchased either for $120 cash or for $135 on the following conditions: $30 is to be paid in cash and the remainder in 7 monthly installments of $15 each. We see that the difference between the cash price and the installment price is $15; this may be regarded as interest charged by the company for the privilege of having part of the payment deferred. Since the installment price is $135, of which $30 is paid at the time the purchase is made, we may consider the balance, $105, as a loan made us by the company, on which the interest has been paid in advance. The monthly payments of $15 each may be regarded as payments to reduce this loan. For example, suppose that on January 1 the radio set was purchased and $30 in cash was paid. One month later, on February 1, a payment of $15 was made, which means that that particular $15 had been loaned for only 1 month. On March 1 another $15 was paid which had

been loaned us for 2 months. Similarly, the payment of April 1 is equivalent to the repayment of a loan for 3 months and that of May 1 to a loan for 4 months. Continuing in this way we get the table shown below.

| | | | | | |
|---|---|---|---|---|---|
| Installment of Feb. | 1 | repays a loan of | $15 | for | 1 month. |
| Installment of Mar. | 1 | repays a loan of | $15 | for | 2 months. |
| Installment of Apr. | 1 | repays a loan of | $15 | for | 3 months. |
| Installment of May | 1 | repays a loan of | $15 | for | 4 months. |
| Installment of June | 1 | repays a loan of | $15 | for | 5 months. |
| Installment of July | 1 | repays a loan of | $15 | for | 6 months. |
| Installment of Aug. | 1 | repays a loan of | $15 | for | 7 months. |
| | | | | | 28 months |

Adding the number of months given in the table we find that the various installments have been equivalent to a total loan of $15 for 28 months, which is equal to a loan of $28 \times \$15$ or $420 for 1 month. Dividing $420 by 12 we find that a loan of $420 for 1 month is the same as a loan of $35 for 1 year. In other words, a loan of $15 for 28 months is equivalent to a loan of $35 for 1 year, and for this loan an interest charge of $15 was made. Since $15 is 43% of $35 we see that the purchaser, in order to enjoy the installment privilege, has had the equivalent of borrowing money at the rate of 43% a year. Such a rate of interest seems to be extortionate compared with that charged by a pawnbroker. We must clearly understand that so far as the purchaser is concerned, he has actually paid at the rate of 43% yearly for the privilege of buying on installments. On the other hand, the company has not enjoyed a 43% return on its money since it had supplementary expenses due to the original investigation of the purchaser's reputation, to accounting, and to defaulted contracts, which have so reduced this 43% that the net interest paid the company is much less than this rate.

A further illustration of the high rate of interest often charged on easy-payment purchases is found in an advertisement of a pair of dumbbells which has recently appeared in a number of magazines. These dumbbells, which, it is claimed, can make a Sandow out of any man, may be purchased for $25 cash. On the "easy-payment" plan the price is $30, of which $15 is paid down and the remainder at the rate of $3 a week for 5 weeks. If one will work this problem

out he will find that the "easy-payment" plan is the equivalent of borrowing money at the rate of 578%. One who would make such a purchase after knowing this fact would himself be classed as a dumbbell. In a few large companies, where the machinery for keeping track of and collecting installment payments is particularly well developed, the difference between the cash and installment prices is sufficiently small to be equivalent to a rate of interest as low as 14%, but the writer has seen no easy-payment terms which are "easier" than this. In most companies, even for the purchase of necessities, buying on the deferred-payment plan is equivalent to paying interest at an annual rate of 30% or more. For luxuries like jewelry and radio sets, where the possibility of non-payment is greater, the interest rate averages considerably higher.

In the teaching of this subject the emphasis should be placed not on what the company makes, but *on what the purchaser has to pay*. All pupils should be made to realize that while the installment plan is sometimes of benefit in enabling us to buy necessities when we have little ready cash, it is in most cases an expensive way of borrowing money to satisfy more or less extravagant wants. The people of our country should be taught from childhood that it is wiser and more economical to pay cash prices after saving a little money every week than to buy on the installment plan.

*Topics for Each Group.* Obviously this subject should have a place in the arithmetic curriculum for all groups. The work may be divided as follows:

For the Z group of pupils probably the most we can do is to point out the facts.

The X and Y pupils should take up the arithmetic of the situation as an application of the subject of interest, finding the rate of interest actually charged, as illustrated above.

The X pupils may also work typical problems on the assumption that the interest is paid at the time of the last installment instead of in advance. In a given problem this will give a higher rate of interest than that obtained by assuming the interest paid in advance.

## PRINCIPLES OF TEACHING THE SEVERAL GROUPS

We have shown that for each topic the difficulty of the work to be given must be limited in the case of the slow or Z pupils. The

methods of instruction for this group must also be different from those used with the average and the superior children. In the Detroit public schools, after five years' experience in sectioning pupils on the basis of ability, it has been found that the Z pupils have poorer powers of concentration, comprehension, organization, retention, analysis, and association of ideas. Therefore the teacher of this group should cover the ground in each lesson very slowly and carefully, in several short periods rather than one long one; she should explain every detail of a problem and avoid situations that involve too many details; her questions should be direct and should act as a guide through the steps of a problem. The Z group learns through constant review and drill and through meeting the same situation again and again in slightly varied settings.[4]

The superior or X group, in general, has ability just where the Z group lacks it. Superior children are more curious and more easily interested. They have relatively little difficulty in fixing their attention on a subject and in abstracting and retaining significant points. Their thinking is in every way quicker, more logical, and more penetrating.

The children in the X group should, consequently, be taught by methods almost the direct opposite of those outlined for slow children. The amount of drill and review should be considerably reduced for the bright pupils, and projects and talks by pupils concerning life uses of arithmetic should be substituted. These children can be given applied problems to analyze without the detailed guidance needed by the Z group; they can be taught general principles and abstract theory where inferior children could only appreciate isolated facts; and they can often be expected to explain why a rule or procedure is true, where Z children should only be drilled in the application of the rule.[5]

## AIMS OF INSTRUCTION IN ARITHMETIC

While the materials and method of our teaching must vary according to the abilities of the pupils, the aim of instruction in arithmetic is the same for all groups. We have already pointed out that our purpose should not be solely the teaching of computation and

[4] See *Arithmetic Developmental Lesson Units*, by Thiele and Sauble. Board of Education, Detroit, 1925.

[5] See *Modifying the Technique of Instruction for Gifted Children* by M. E. Herriott. University of Illinois Bulletin, Vol. XXIII, No. 18, January 4, 1926.

its immediate application to problems. It is important also to teach the proper interpretation of arithmetical expressions like those mentioned in the discussion on decimals, which involve no computation whatever. Another illustration of this need for interpretation is found in percentage, where an understanding of everyday expressions like the following must be given:

Real estate values in Westchester County have increased 400 per cent during the past few years.

During March household goods may be purchased at savings of 25 per cent.

The wages of the steel workers have been increased 10 per cent.

This building is 100 per cent fireproof.

Tire sales drop 10 per cent.

A 20 per cent deposit will secure any purchase at this sale.

About 1/5 of 1 per cent of the people of the United States have an annual income of $60,000 or more.

When we read the above statements in newspapers or magazines, they involve no computation on our part, yet a knowledge of arithmetic is necessary for their correct interpretation.

Over and above the computational and language sides of arithmetic is the third function of this subject, which has already been illustrated in the discussions on life insurance and installment buying, namely that of inculcating a point of view or an economic lesson. Because of the dependence of money matters upon arithmetic this third function, which we may call *economic appreciation,* is of great significance in the present and later lives of the pupils.

In searching for materials to fulfill these three aims of instruction in arithmetic, the expert curriculum makers now at work throughout this country must not confine their efforts too exclusively to a statistical or analytical study of curricula already in use. It does not follow, because a topic is found in the great majority of one hundred different courses of study, that it should continue to be taught, though its presence in many such courses is sufficient to make us weigh that topic carefully before rejecting it. On the other hand, the absence of a given topic in a large number of courses of study is no indication whatever that that topic should not be taught, though it may be required to justify itself fully before being accepted as material for future instruction. Sound curriculum making will not only give the fullest respect and consideration to all the systematic efforts now being made but will also supplement them by an adequate inventory

of the arithmetic needs of life itself, whether they call for computational and problem-solving skill or merely for better interpretation and appreciation of the quantitative phases of life about us.

Some of the most fruitful contributions of the past ten years to the "new arithmetic" have come from the more serious studies which have surveyed in a broad way the actual uses of arithmetic as found in the various vocations as well as in the personal lives of individuals. A few of these studies, however, have given us very limited and often incorrect guidance since they have ignored the interpretative and appreciative functions of arithmetic. Our greatest need to-day is a broadminded, intelligent, and keenly analytical evaluation of arithmetic as actually used in life, such a survey to be made coöperatively by a large group of competent workers trained both in education and in mathematics.

# MATHEMATICS IN THE JUNIOR HIGH SCHOOL

By JOHN R. CLARK

*Member of the Staff of the Lincoln School, Teachers College*

IN submitting this discussion I assume that the reader is interested in considering the meaning and purposes of mathematics in the junior high school rather than in a detailed statement of a course of study in the subject. In order to present my conception of the nature and purpose of mathematics in a junior high school, I have chosen to speak through the now familiar "curriculum committee," indicating the discussion that would probably ensue in preparation for the formulation of a detailed course of study. (See footnote below for an explanation of the persons who contribute to this discussion.[1])

## I

### THE FIRST CONFERENCE

*Mr. Jewell:* Two weeks from to-day, as you know, we plan to open the first junior high school in our city. Many of us have been asking ourselves in what respects the kind of education that our pupils will receive, or should receive, in this new school may be expected to differ from that which they have been receiving in our conventional type of school. While we are aware that there is developing in this country a *new education,* so to speak, few of us have any definite convictions about its general aims and philosophy. Still fewer of us feel that we know exactly what should be taught in any subject in the junior high school, even in mathematics, the

[1] Mr. Jewell, principal-elect of the new Roosevelt Junior High School.
Dr. Henderson, professor of mathematics in State College.
Dr. Jones, professor of education in State College.
Dr. Tompkins, professor of psychology in State College.
The Misses Scott, Brown, Murphy, Ryan, O'Rourke and Davidson, and Messrs. Hardin and Hughes, recently appointed teachers of mathematics in the Roosevelt Junior High School.
Mr. Smith, a realtor, and a member of the Board of Education.

subject in which we are particularly interested. Realizing that we should be more familiar with the ideals of this new education, the Board of Education has asked us to come together for a series of conferences for the purpose of formulating a course of study in mathematics. We want to enter into our new work with as much insight and understanding as possible. I feel that too many cities have adopted the junior high school in name only. They have not appreciated its real function.

To help us think through the problems of making a course of study in mathematics for our new school, we have arranged to have certain of our friends from State College meet with us. Dr. Henderson, Dr. Jones and Dr. Tompkins certainly need no introduction to this group.

*Mr. Smith:* I'm not sure, Mr. Jewell, that we members of the Board, ever really understood just what you meant by the ***new education.*** We had enough confidence in you to accept your recommendation to adopt this new plan of organization, and besides, our neighboring cities are adopting it. But I should like to know just what you really mean by the ***new education.***

*Mr. Jewell:* As I understand it, this idea was developed by certain distinguished American educators, including such men as Briggs, Davis, Inglis, Judd, Koos, and of course, our own Dr. Jones. Let's have Dr. Jones answer your question.

*Dr. Jones:* The new education is a term we apply to the aggregate of modern ideas about the meaning of education and the nature of the educative process. It implies, for example, that the purpose of education is to promote the good life. This means that health, ethical character, citizenship, industry, worthy uses of leisure, command of the fundamental processes, and the like, are to be basic in all our thinking about education. The term implies, also, that pupils learn more readily and more permanently when they appreciate the significance of what they are learning. It suggests, too, that pupils develop more rapidly when they are actually engaged in investigation or problem solving than when they are required to memorize a great many assigned tasks later to be reproduced for the teacher.

The old education had too little respect for the pupil as an individual,—for his needs, interests, and capacities. It cared little whether the subject appealed to the learner; whether it was a sig-

nificant part of our social heritage; or whether the pupil would ever use it. The old education certainly made serious blunders in the way it sought to teach the subject in which you people are most interested.

*Mr. Smith:* What you say seems very sensible. But won't you be a little more specific in your explanation? Perhaps you could give some illustrations.

*Dr. Jones:* I'm very sorry for being so vague. To be more specific, there are five important aspects of the new education that we should keep in mind.

In the first place, we have recently begun to analyze social needs. Studies have been made to ascertain the specific kinds of mathematics that are needed in everyday life. Much to our chagrin, there is a wide gap between the kind of mathematics that we teach and the kind that is most generally used in modern life. In other words, we have realized that there are many things that pupils should know that are not taught in the schools, and many things that are taught in the schools that are of comparatively little value.

In the second place, the new education rests upon a sounder psychological basis. We now know a great deal about the ways in which children learn. Children's minds work in very definite ways. There are good ways and poor ways of teaching. Our knowledge of modern psychology enables us to save much time and effort through improved methods of teaching. We shall certainly wish to discuss this point at great length when we advance a little further with the formulation of our course of study. I'm sure that Dr. Tompkins will help us a great deal on this topic.

Again, we have only recently appreciated the extent to which pupils differ in their ability to learn. We now realize that it is folly to expect the same results from the same effort on the part of different pupils. I dare say that you, Miss Scott, have had pupils in your classes who never could learn to solve a quadratic equation.

*Miss Scott:* Worse than that. I've had pupils in algebra classes who couldn't add ½ and ⅓ and get anything but ⅖.

*Dr. Jones:* I regard the use of educational measurements as the fourth important factor in the new education. We are rapidly becoming able to measure by means of tests what a pupil has learned by this or that method in this or that length of time. We shall presently be able to study the efficiency of various methods of build-

ing up knowledge or power in the minds of our youth in the same scientific way in which we study the efficiency of the gas engine. I assume that we shall be concerned to make the best use of the various standard tests as aids in our teaching.

*Miss O'Rourke:* I have made a special study of the ways in which these tests are helpful to us. In fact I have a paper on that topic.

*Mr. Jewell:* That's fine. We'll have a place for that, Miss O'Rourke. Did you not have another point, Dr. Jones?

*Dr. Jones:* I was just coming to that. It applied specifically to the junior high school, and is accepted by practically all of the eminent educationists. It is: In the junior high school grades we believe that the pupil should explore the significant fields of knowledge so that he may secure some notion of their nature and thereby discover his aptitudes and interests in these fields. The approach to each of these important branches of knowledge should be by way of general introductory courses, containing the most worthwhile elements in each of the major branches. The larger, more fundamental aspects of the courses, not the details, should be emphasized. This point of view, as you see, is quite opposed to the older, more prevalent notion.

*Dr. Henderson:* I am particularly interested in the last suggestion made by Dr. Jones. Am I correct in thinking that you recommend a general introductory course in mathematics, a course in which arithmetic, algebra, geometry, and possibly trigonometry will be *sampled,* to extend throughout grades seven, eight, and nine?

*Dr. Jones:* Quite right. The fundamental philosophy of junior high school education states that these general introductory "overview" courses more effectively meet pupils' needs, whether they be in their pursuit of a livelihood, of culture, or of happiness. What do you think of the idea, Mr. Henderson?

*Dr. Henderson:* I never approve or disapprove a proposition until I have thought it through most carefully. But I am inclined to think that I agree with your general principles. I am certain that we need a change from our present practice of teaching only arithmetic in the first eight grades. We waste a great deal of time this way. And I am very certain that something is radically wrong with our first year algebra. It means very, very little to many of those who take it. You would be shocked if I were to tell you how

little algebra pupils know when they enter my college classes. They seem to have learned absolutely no mathematical principles. I should emphasize power to reason and to do precise thinking rather than so much manipulation.

*Mr. Smith:* I have been very much benefitted by this discussion. I had hoped, however, to learn more of the particulars about the course in mathematics, as you plan to have it this year. Shouldn't mathematics be more practical—more usable? How do you think the course will differ from the older courses, Mr. Jewell?

*Mr. Jewell:* From my twenty years' experience in teaching mathematics, from my study of the School Curriculum, and from what I know about psychology, I think our new course should have the following characteristics:

It should be practical. I think the course should be selected to prepare for actual or highly probable social needs. The most useful skills, concepts, and attitudes to be derived from the entire field of elementary mathematics should constitute the new course.

It should be simplified. Courses in mathematics have been undergoing a continuous process of simplication for half a century. The more complicated and less practical elements have gradually been dropped. This movement has probably sufficiently reduced the *difficulty* of courses for the "above average" pupils. But further simplification for the "average" and "below average" pupils seems to me to be imperative. This movement will likely continue until the courses are within the comprehension of three-fourths, or more, of the pupils who take them. Differentiated courses in which the degree of difficulty and the capacity of the pupil are not incommensurable should be developed.

The course should be extensive rather than intensive. Much emphasis is being placed upon the importance of offering pupils in these grades a general survey of the major fields of knowledge. To provide the opportunity for an "over view" or exploration of the subject of mathematics, it is necessary to choose materials from algebra, geometry, trigonometry and arithmetic. Within sensible restrictions an "exposure" to a wide range of mathematical subjects and methods should replace the traditional intensive drill upon more limited fields of mathematics, such as we have seen in our own classes.

Emphasis should be upon power rather than technique. Mathe-

maticians have generally insisted, as did Dr. Henderson, that power to reason and an appreciation of precise thinking constitute the more permanent outcomes from the study of mathematics. In the school, however, the nature of both the materials taught and the methods employed in their teaching have inhibited these outcomes. Formal, uncritical learning has replaced the inquiring, reflective, research spirit that should characterize the teaching of secondary mathematics. It is hardly necessary to state that technique has its place as a necessary tool, because it has so greatly overshadowed attention to discovery, to generalization, to *mathematical* thinking. To-morrow we shall discuss the big, major, aims of mathematics. I am sure that Mr. Smith will then feel that we have our "feet on the ground."

## II

### THE SECOND CONFERENCE

*Mr. Jewell:* What are the valid aims or objectives of mathematics in junior high schools? Some may think this a needless question. But isn't it true that the kind of mathematics that we shall decide to teach will depend very largely upon our reasons for teaching the subject,—upon objectives or aims that we accept as valid? What aspects of the whole field of mathematics should be emphasized in junior high schools?

*Dr. Jones:* I believe that we should teach the mathematics that is most useful in modern life. For example, any good citizen should know something about common, everyday business practice. By this I mean that he should understand the meaning and uses of checks, notes, receipts, interest, discount, taxes, and the like. Here we have need for two kinds of mathematics—computation and business practice. Accordingly, I would propose two large objectives, to be kept in mind when we come to select the details of the course.

*Mr. Hardin:* I certainly agree with the first point made by Dr. Jones. Everybody needs to know how to compute. But I would go a bit further, and say that they should not only know how to compute, but they should actually compute with 100 per cent accuracy. I think it is high time for us to take a stand against the terrible inaccuracy that we see in the average classroom. I'm going to *demand* accuracy in computation, if it is the only thing I do this year.

*Miss Murphy:* I should think that pupils would have sufficient skill in computation when they enter junior high school. What have they been taught in arithmetic in the elementary school? Don't they have sufficient skill? I once heard a professor of education say that pupils could learn all the arithmetic they would ever need during the first six grades.

*Mr. Jewell:* The fact is, Miss Murphy, that pupils do not acquire dependable habits of computation in the first six grades. And since they do not, we surely need to consider this as one of our big problems. Without attempting now to decide just how much skill in computation is needed, let us agree that our first responsibility to our pupils is to see to it that they develop a facility in computing. Dr. Tompkins, have you a suggestion?

*Dr. Tompkins:* I have often been amused to hear teachers of mathematics claim that mathematics develops in the pupil ideals of precision and accuracy when they tolerate a degree of inaccuracy in computation which results on the average in one error out of four computations. To be serious, I am in hearty sympathy with your emphasis upon greater accuracy. Pupils should be taught that it is not only futile, but altogether wrong, to leave a computation until, by checking, they are morally certain of the accuracy of their results.

*Miss Brown:* Wouldn't it be in order to ask Dr. Tompkins to tell us how to secure greater accuracy?

*Mr. Jewell:* That's very important, but I think we should postpone a discussion of it till a later conference. Is there anything more to be said about the uses of mathematics in connection with business practice? You recall that Dr. Jones considers an understanding of common business practice and the ability to solve everyday problems connected with it important in modern life. Shall we consider the teaching of business practice a really major objective in our course?

*Mr. Hughes:* I never thought that I was teaching real mathematics when I taught such topics as stocks and bonds, mortgages, insurance, investments. They seem to me to be primarily informational, more like social studies. Computation plays a small part in an understanding of these aspects of business practice. Should we not leave these things out of our course, and put in some real mathematics—some intuitive geometry and some algebra?

*Dr. Jones:* I protest against the implication of the last remarks.

If the primary purpose of teaching mathematics is to help people to think *quantitatively* about the problems of the home, the farm, the store, the local government, and the like, then it certainly is important to teach our youth the meaning and uses of such concepts as budgets, simple bookkeeping, something about investments and insurance, and certainly an appreciation of the way money or savings grow when touched by the magic of compound interest! You are quite right, Mr. Hughes, in suggesting that this is not *pure mathematics*. But it is mathematics at work in the solution of personal, home and community problems. Now, of course, it may be that business practice should be taught in connection with some subject other than mathematics. But we have to face facts as they are. The teaching of business practice has been assigned to the department of mathematics and it is our responsibility to accept it.

*Miss Davidson:* I have just taken a course on the Reconstruction of the Curriculum at the University with Professor Johnson in which this very issue was raised. Professor Johnson believes thoroughly in teaching pupils the uses of mathematics in the home, the store, the shop, in the bank,—in business practice, as he calls it. He thinks that we teachers of mathematics often fail, however, to emphasize the informational and meaning aspects. According to his theory, it is a mistake to spend only a few minutes teaching the meaning and uses of taxes, let us say, and to spend a great deal of time in figuring examples such as "compute the tax paid on $21,600 worth of property when the tax rate is $2.50 per $100." I believe that we have had the wrong idea about this whole problem. I agree with Dr. Jones that whether business practice is mathematics or not, it is most important when properly taught. It teaches worthwhile facts, more so than does algebra or geometry.

*Mr. Jewell:* Then we shall accept as our second major objective the teaching of common business practice. I was practically certain that we would decide to do so. But how are we to decide upon the more specific facts about business practice to be included in our course? Perhaps we should also delay the discussion of this problem until a later conference. In the meantime we shall have an opportunity to consult any researches that may have been made in this field.

*Dr. Henderson:* I hope that we are not going to limit our junior high school mathematics to the development of dependable habits of

computation and to an understanding of the simple, generally used, facts and processes of business practice. Let's go a little further with the analysis of the kinds of mathematical problems that people find it advantageous to be able to solve. We shall soon meet the age-old question that people ask about material objects: What is their size? What is their shape? What is their position or location? Are we not going to teach pupils these notions about size, shape, and position? Intuitive geometry gives the answers to these questions. It teaches pupils to measure length, area, and volume; to classify various geometric forms, to construct many geometrical figures and designs; and to appreciate the wide rôle of geometry in art, furniture, clothing, architecture and nature. I regard this as one of the most educative subjects in the whole field of mathematics. It is stressed, as you know, in practically all European schools in the years corresponding to our junior high school grades. And, of course, I need not say to you that intuitive geometry is an ideal preparation for demonstrative geometry. It is practically a prerequisite for the study of demonstrative geometry.

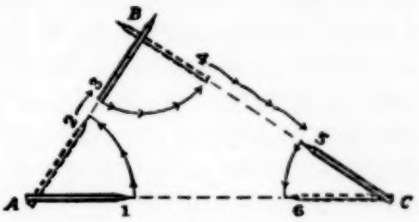
*Miss Ryan:* I have never clearly understood just what intuitive geometry really is. There may be other teachers here, too, who are not any too clear about it. Is intuitive geometry the same as the *mensuration* that we studied in the old arithmetics? Is it not just a new name from an old idea? As you may suspect, I've been teaching long enough to have seen one fad after another come and go. I don't believe in panaceas.

*Dr. Henderson:* Intuitive geometry is a study of the properties of space by investigation and experiment. It is a laboratory subject. Pupils measure, draw inferences, check up these inferences. They learn to use the methods of science. In these respects, intuitive geometry is unlike both the mensuration of the older arithmetics and the demonstrative or logical geometry of Euclid.

*Mr. Jewell:* I infer from this discussion that there are different ways to learn a fact, particularly some geometrical fact. Dr. Tompkins acts as if he wished to speak on this subject.

*Dr. Tompkins:* I wanted to call attention to three ways of learning the fact that the sum of the angles of a triangle is 180 degrees. You might teach this fact *experimentally* by having your pupils measure the angles of a number of triangles, find the sum of the

angles of each triangle, compare these sums, compute their average, and draw the conclusion that the sum must be 180 degrees. This experimental method, when based upon refined observation and measurement, leads to strong conviction. It is the method by which pupils arrive at a great many generalizations about spatial relations.




There is a second method by which you may convince your pupils of this fact. To illustrate, you may turn a pencil through the angles of a triangle, as I shall indicate by this figure. Please note that in turning through the three angles the pencil has reversed its direction, and has, therefore turned through 180 degrees. You will agree that this method leads to strong conviction. A pupil will see *intuitively* that the pencil in turning through the three angles, has turned through a straight angle. This is a very good illustration of intuitive geometry. Most of us first learned this fact by another method—that of demonstration or logical proof. By the use of axioms, postulates, definitions, or previously proved facts, we proved that this was true.

*Miss Scott:* Which of these methods do you recommend for junior high school pupils?

*Dr. Tompkins:* The logical or demonstrative method should certainly follow the others. Even though measurement and intuition are fallible and demonstration is infallible, I should certainly use them first. If time permits, I should use all three. The typical eleven-year-old or twelve-year-old pupil revels in the explorations of space relations that are opened up to him by the methods of intuitive geometry. The skillful teacher, of course, will gradually lead the pupil to be skeptical of his conclusions and thereby prepare him for the more certain method of establishing conclusions, the method of demonstration or proof.

*Miss O'Rourke:* I like this explanation of intuitive geometry. I fear that I have not given my pupils sufficient opportunity to investigate, to experiment. Apparently there is considerable educational value in the *learning* of the fact. Pupils not only learn the particular fact, but they also learn how to investigate or how to study.

*Dr. Jones:* I think we might as well admit that pupils soon forget many of the facts that we teach them. The more permanent values often are the attitudes and general notions that are developed. Intuitive geometry certainly is rich in the possibilities it offers for teaching pupils ways of discovering things for themselves. The mathematicians are right in attributing great value to intuitive geometry. I never before appreciated its educational possibilities. I think that Dr. Henderson suggested the third major purpose of teaching mathematics when he said people need to determine the form, size, and position of objects in space. Shall we agree, then, that the third major objective of mathematics in junior high school is an understanding of the properties of common space forms and relations, together with the development of the ability to solve the more practical problems pertaining to these forms?

*Mr. Jewell:* All seem to be agreed. For the reason, then, that everybody needs to be familiar with the properties of common space forms, and for the further reason that pupils will not have learned these before entering junior high school, we have decided to emphasize the study of space relations or intuitive geometry, as we call it, in our course of study.

Are there other big aims or objectives that we should keep in mind in organizing our course of study?

*Dr. Henderson:* Well, I should say that we haven't even mentioned the most significant notion, as a mathematician sees it. The really great, fundamental, unifying notion in mathematics is that of relationship or law. Let me give a number of illustrations.

The speed at which an object falls toward the earth increases very rapidly during its descent. During the second second it falls many more feet than during the first second, and so on for subsequent seconds. There is a definite relation or law between the distance (in feet) and the time (in seconds). As you know, $d$ and $t$ are variables that change together according to the law $d = 16t^2$. Or take the relationship between weight and distance in the familiar teeter board. We want this relationship, $W_1/W_2 = l_2/l_1$, to be full of meaning to pupils. I am asking that more attention be given to this notion of law,—the function concept, as it is often called.

*Mr. Hardin:* In my work in physics and chemistry I learned to appreciate the importance of being able to think in terms of mathe-

matical law. We were constantly using the notion of direct or inverse proportionality. I think more attention should be given to this phase of mathematics.

*Miss Ryan:* All of us teach how to find the area of circles. Probably most of us have our pupils express the rule by the formula $A = \pi r^2$. But if we stop here, they get no adequate notion of the relationship between the two variables, $A$ and $r$. We should go a step farther, and bring out the idea that $A$ varies as the square of $r$, meaning that when $r$ is doubled, $A$ becomes 4 times as great and so on; and that you can express the relation between $A$ and $r$ graphically or in the form of a set of tables from which you can read any value of one variable corresponding to a given value of the other. I should also wish my pupils to see that the law, $A = \pi r^2$, may be written in the proportion form: $A_1/A_2 = r_1^2/r_2^2$.

*Miss Brown:* We aren't going to teach only such algebra as is required for success in handling these mathematical laws? To do so would probably exclude a large part of the work with polynomials, factoring, special products, fractions and simultaneous equations. I shouldn't want to see these "old stand-bys" deserted.

*Dr. Henderson:* I should like to see us build a course in which this function concept is the central unifying principle. Let us choose only those elements of the conventional first-year algebra that contribute to the development of this fundamental notion. Pupils should learn something about how these laws are discovered. They should associate the three methods of expressing relationships—the formula, tabular, and graphic methods. They should learn how to derive new statements of laws. We certainly believe that they should solve many genuine problems involving these laws.

*Dr. Jones:* This discussion of the function idea has certainly been a revelation to me. I never even heard of it in the courses that I studied. I can see, however, that it is one of the most practical notions in mathematics. Besides, it has wide application in other branches of knowledge. Apparently it is one of those broad concepts that proves helpful outside the mathematics classroom.

*Mr. Jewell:* Then you wish to emphasize the notion of relationship between quantities that change together according to some mathematical law? For example, you wish pupils to appreciate such laws as (1) the value of a fraction varies directly as its numerator

and inversely as its denominator; (2) the volume of a gas is inversely proportional to the pressure to which it is subjected; (3) the horsepower of a gas engine varies as the number of its pistons, and the square of their area; (4) the volumes of similar solids are to each other as the cubes of their corresponding dimensions; (5) in a teeter board, weight is inversely proportional to lever-arm, and the like. You wish pupils to think algebra as a living, dynamic thing. You believe the practical, cultural and disciplinary values to be derived from this type of algebra exceed those obtained from the older courses in which formal manipulations of algebraic numbers were emphasized.

Let us agree, then, that the fourth fundamental purpose of teaching mathematics in junior high schools is to teach pupils to think in terms of mathematical law, to use its language or notation, and to develop some facility in applying (and discovering, wherever possible) these laws in the solution of problems.

We called this second conference, as you know, to discuss the larger aims that should be kept in mind in making our courses. Are there not other major objectives?

*Miss Davidson:* I read an article in the *Mathematics Teacher* on "Geometry in the Junior High School" in which the author expressed the idea that we should teach some demonstrative geometry. He argued that since only a small percentage of our pupils study mathematics beyond the ninth grade, it is highly desirable to include at least an introduction to the idea of *proof* in the ninth grade. Everybody, according to the writer, should know what it means to *prove* a point—how to make an unassailable argument. There is another reason for considering this question. Junior high school courses, as you know, are supposed to survey or explore the major fields of knowledge. Certainly a pupil has not had an exposure to the whole field of elementary mathematics if he has not had a "look in" on Euclidean geometry. Should we not accept this as a fifth important aim of our course?

*Dr. Henderson:* Wouldn't it be better to omit the geometry? Junior high school pupils are very immature. Geometry was designed for grown-ups. It was a college study until comparatively recently. Moreover, pupils do not really appreciate the meaning and nature of proof until they have spent three or four months on it. I don't believe we have this amount of time for geometry in the ninth grade.

It may be feasible for very superior classes, but I should oppose it as a requirement for all pupils.

*Mr. Jewell:* How many agree with Dr. Henderson? Practically all, you see. Then we shall, for the time being at least, confine our list of major objectives to the four already agreed upon.

*Miss Scott:* I should like to know more about the details of the course, the specific skills and meanings which should be developed. School is to open soon. I think we should make our course of study.

*Dr. Jones:* The course of study, Miss Scott, is the *textbook.* Teachers teach the text. They follow the textbook, not the guide or manual that we have been calling the course of study.

*Miss Ryan:* That is true. The city in which I taught last year had a two-hundred-page course of study. It was not written primarily to help us teach the adopted text. And the choice and sequence of topics in the text did not agree with the course of study. What could I do? I was too busy with my five classes and study hall each day to do anything but follow the textbook.

*Dr. Henderson:* I never could see the objection to following rather closely a good textbook. I cannot improvise exercises as valuable as those provided by a careful author. Now that we are agreed upon the main large aims of junior high school mathematics, I suggest, Mr. Jewell, that we examine the various sets of textbooks there on your shelf and adopt the set that most fully and effectively provides for the realization of our objectives.

*Dr. Jones:* Dr. Henderson is right as far as he goes. I should urge that Mr. Jewell and the teachers of mathematics meet once every two weeks to compare notes on successes, failures, number of hours being devoted to each of the topics, ways of supplementing the text to make it fit our local conditions, test results, and the like. Later they might wish to write a manual showing how they teach the text, the time spent on the major topics, the quality of achievement to be expected from low, normal, and bright groups of pupils, samples of pupils' work, etc. The manual, together with the textbook, would then constitute their course of study.

*Mr. Jewell:* I believe that you men are correct. How many agree? Practically unanimous, you see. At our next meeting we shall choose a textbook. The score cards I have here will help you to analyze the texts, but keep in mind, of course, our major objectives.

# THE MATHEMATICS OF THE SENIOR HIGH SCHOOL

By W. D. REEVE
*Associate Professor of Mathematics, Teachers College*

## PRESENT STATE OF AFFAIRS

MATHEMATICS *for Everybody*. The typical junior high school, constituting Grades VII, VIII, and IX, now offers some kind of a general introductory course in mathematics. The content, methods of teaching, and order of presentation of topics may vary from place to place, but the great central purpose is fairly uniform. This type of course should prevail in all seventh, eighth, and ninth grades throughout the country even though the junior high school organization as such is not universally recognized. Everybody who wishes to be educated should know something of the essential applications of arithmetic, of the central features of intuitive geometry, of the meaning and uses of algebra, of the nature and value of numerical trigonometry, and of the meaning of a demonstration in geometry. The course described above should be required of all pupils whether they leave school at the end of the ninth grade or go on to the senior high school. In four-year high schools it will be necessary to require some kind of course in the ninth grade that will give the pupils a training that, in the long run, will represent what the educated citizen should know about mathematics as a tool.

*Purpose of Senior High School Mathematics*. The purpose of the mathematics course in the senior high school is to meet the needs of the following four groups of pupils:

1. Those who intend to go on to colleges and technical schools.
2. Those who are going to specialize in commercial work that requires mathematics, especially algebra.
3. Those who expect to specialize in science.
4. Those who desire to study mathematics further because they like it.

Because of the purpose outlined above it would seem that the senior high school course in mathematics should be made elective.

*Content of the Course.* Obviously the content of any course in mathematics should be determined by the purpose in mind. At the present time there is little attempt in most high schools to consider the needs of individual groups like those above, or even of individuals themselves. Indeed, this may continue to be true of the majority of the small high schools of the country.

Geometry is required of nearly everybody, regardless of whether the pupils taking it can all profit by its study. This condition is due almost entirely to the dominance of extramural examination boards who have in mind only the needs of the first group mentioned above. Plane geometry is taught in all schools,—usually in the tenth grade. But beyond that point there is no uniform practice. In some schools intermediate algebra and solid geometry are taught in the eleventh year, in others these subjects may be deferred until the twelfth year. In a few high schools trigonometry and college algebra are offered in either the eleventh or twelfth year, but the number of such schools is very small. Even where such higher courses are offered, the situation results not so much from a desire to meet the needs of any particular group as it does because of the influence of some local teachers. In rare cases we have schools in which analytic geometry and calculus are offered, as is the case in Wadleigh High School in New York City, the University High School, at Oakland, California,[1] and in certain other laboratory or experimental schools like the Horace Mann School and the Lincoln School of Teachers College. The report of the recent National Committee on the Reorganization of Mathematics gives a list of such schools and also a statement of the work they are trying to do.[2]

We may not be sure what the new course in mathematics ought to be, but we know that the present situation in most schools is very unsatisfactory.

## PROBABLE FOUNDATION COURSES

*What the New Mathematics Should Be.* H. G. Wells in *Mankind in the Making* says, "The new mathematics is a sort of supplement

[1] Durst, Ethel H. "Calculus for High Schools." *University High School Journal*, June 1926, pp. 135-167.

[2] *The Reorganization of Mathematics in Secondary Education.* Report of the National Committee on Mathematical Requirements. Chapter XII.

to language, affording a means of thought about form and quantity and a means of expression, more exact, compact, and ready than ordinary language. The great body of physical science, a great deal of the essential facts of financial science and endless social and political problems are only accessible and only thinkable to those who have had a sound training in mathematical analysis, and the time may not be far remote when it will be understood that for complete initiation as an efficient citizen of one of the great new complex world-wide states that are now developing it is as necessary to be able to compute, to think in averages and maxima and minima as it is now to be able to read and write." While to those who have given the subject no thought this may seem to be a strong statement, the fact is that we are going to discover many more ways to use mathematics profitably in the next generation.

*Elementary Algebra.* In the absence of a junior high school organization many four-year high schools will continue to offer, as they do now, a course in elementary algebra. No course in the high school curriculum has made more progress recently than algebra. The recent changes in the spirit of teaching and in the purpose of education make it necessary for textbook writers to set forth the results of the latest investigations in the field of algebra in a manner which shall meet the needs of the classroom. There are four topics of algebra that the educated citizen needs to know whatever his occupation may be. They are the formula, the simplest types of equation, the graph, and directed numbers. These topics are important because they contain the information which the citizen should possess for his everyday reading in current literature, in popular science, in the newspapers and other periodicals of the home, or in the simpler class of technical handbooks. These topics, therefore, are fundamental, either for the pupil who is to go on with more advanced work or for the one who, upon leaving school, is to take up at once some line of business or a home career.

*Plane and Solid Geometry.* The purpose of the geometry course is to show the pupil the meaning of a demonstration, to enable him to have the satisfaction of proving something, to let him see the significance of mathematical precision, and feel the joy that comes from discovering absolute truth. In other words, the work in geometry is the only course in deductive logic which a pupil can get

in a secondary school.[3] It is better than pure logic because it has in it figures that illustrate the things that are said and done.[4] If geometry is not taught to give a training in deductive logic, in the power to prove one's own statements, or if it does not do both, then it is not worth teaching.

In view of the pressure of time and the needs of the curriculum, it is clear that we can no longer justify in all schools, separate courses in plane and solid geometry extending over a year and a half. The tendency in many schools at the present time is to devote one year to the study of both and to combine them properly for teaching purposes.

The difficulty with the ordinary geometry course in American high schools is that we have held too strongly to the systematizing motive and have given the pupils an unadulterated form of Euclid. We should profit by the suggestions of The Mathematical Association[5] even though we need not imitate in every detail the practice which its report advocates. The British list is not so long as ours used to be, and it spreads the work out over a longer period of time so that it is better understood. Our course must necessarily be somewhat uniform on account of the mobile character of our population, but it need not be so extensive as formerly.

*Number and Importance of Propositions.* The results of geometry teaching can be improved by decreasing the number of theorems we teach, by concentrating on those propositions which are unquestionably fundamental, by recognizing the importance of original work, and by emphasizing ability to demonstrate rather than the number of propositions studied and perhaps often memorized. We now expect the pupil to master only about one hundred propositions.[6] One modern text has nearly one thousand original exercises.

We ought to take many theorems for granted. The three on congruence in the early part of the work in geometry might well be postulated if it were not for extramural examinations. Some teachers say that plane geometry cannot be taught in one year. This presupposes a "definite amount of ground" to be covered, which is a myth. We cannot teach all that is known of geometry in many years

[3] Carson, G. St. L. *Mathematical Education.* pp. 85-112. Ginn and Company, 1913.
[4] Smith, D. E. *The Teaching of Geometry.* Ginn and Company, 1911.
[5] *The Teaching of Geometry in Schools.* Mathematical Association. G. Bell and Sons, (London), 1923.
[6] *Revised Report on the Requirements in Plane Geometry.* pp. 9-17. College Entrance Examination Board, 1923.

or even in a lifetime. We must remember that for some pupils a few propositions will suffice while for others the number must be much greater.

*Plane and Spherical Trigonometry.* Trigonometry is strictly a high school subject. Pupils generally like the subject when it is well taught and we have evidence to show that they do as well with it as do college freshmen two years later.

In a study carried on by the writer at the University of Minnesota high school, a group of high school juniors made, on the same series of examinations in trigonometry, a semester average six per cent higher than a freshman class in the University studying the same subject. This does not prove that the high school pupils were better, but it certainly shows that the subject was not too difficult for them.

The fundamental ideas of both plane and spherical trigonometry can easily be covered in a half year's time and for many pupils it need occupy no more than twelve weeks. Many pupils can learn it in much less time. Since, however, the applications of spherical trigonometry are almost entirely confined to astronomy and geodesy, it has limited sanction under our present conditions.

*Intermediate Algebra.* For those who intend to proceed further in science, economics, mathematics, or other technical subjects, either in college or elsewhere, more mathematical work is necessary. The course in intermediate algebra still occupies a large place in many schools and should continue to do so. In some schools it is amplified so as to occupy a year's time; but a half year should be sufficient, especially if needless reviews of the elementary course are omitted and the remainder of the course is modernized. There is the same need now for reform in the content of some of our intermediate algebra courses as there was ten years ago in elementary algebra.

The essence of the course in algebra should be functional relationship,—the notion of the dependence of one quantity upon another. In some schools trigonometry, analytic geometry, and the calculus are introduced at this point to help bring this about. Professor Nunn, the well known English writer, says, "As soon as the symbols of trigonometrical ratios are recognized as capable of entering into formulas and of being manipulated, they should be regarded as belonging to the vocabulary of algebra. There is, indeed, no principle except the invalid principle of formal segregation, upon which we

can include the study of $x$ or $a$ in the algebra course and exclude sin $x$ or tan $x$. All alike are pieces of symbolism invented for the description and interpretation of facts of the external world. Each represents a typical kind of function. To each corresponds a specific form of curve which may be regarded as the graphic symbol of the function. Both algebra and trigonometry would gain by fusion,—the former through an added variety and richness in the illustration of its main themes, the latter by the removal of the excessive formalism which at present obscures its value and interest for the beginner."

### PROBABLE ALTERNATIVE COURSES

*College Algebra.* In an increasing number of schools there is offered in the senior year a half-year course in college algebra. This would be one profitable way to spend the time if such a course included what is essentially college algebra. In too many places, however, such a course is college algebra only in name, being mostly reviews of the more difficult parts of elementary and intermediate algebra with only an occasional glimpse at new material on the college level. One solution for such a situation is the general adoption of the general mathematics program all through the senior high school,—a plan which will presently be discussed.

*Courses for Future Mathematicians.* For the future mathematicians there will probably be offered certain half-year courses that will be largely informational and basic. Chief among these are college algebra, analytic geometry, projective geometry, the calculus, and possibly a course in what we might call college geometry,—geometry to correspond with the course called college algebra.

The decision as to which of these courses is to be offered will doubtless be left to the particular wishes of the instructor who will have to teach the subject.

*Courses for Vocations.* There will also be offered in some of our senior high schools courses for those who are preparing to enter certain vocations. Thus we may find certain schools offering a course in statistics for those who may later need such work, a course in mechanics for those so inclined, a course in commercial algebra or in commercial arithmetic, and possibly a course in machine-shop mathematics.

*General Mathematics.* There is a demand in an increasing number

of four-year high schools for at least a two-year course in general mathematics for those pupils who remain until they finish the tenth grade. For those who finish their high school educations and who desire to study mathematics further, the general mathematics program should be extended to cover the entire four years.

The demand for such a course is due to the wide differences that exist today both in the work of the junior high school and in the purposes of instruction in the senior high school. Thus, we find one group of pupils in the four-year high school whose previous work in mathematics has been limited to arithmetic, another whose course may have included general mathematics like that set forth in the first or second book of a modern junior high school series, still another group which may be preparing to go to college or technical schools, and a few others who intend to go into business or enter upon some other career. It would be impossible for the traditional courses of study to meet the needs of all such groups.

*Work of the Ninth Grade.* Experience has shown that the most satisfactory division of emphasis in a general mathematics course for the ninth grade of a four-year high school leads to making the work center around algebra, so as to give the pupil an understanding of what the subject means and how to use it. The algebra should be combined wherever possible with numerical computation, with the facts of geometry that are included in what has come to be called intuitive geometry, and with the elementary principles of numerical trigonometry.

The work in numerical computation keeps the pupil conscious of the fundamental importance of arithmetic in all mathematics work; the work in intuitive geometry offers the best possible preparation for a unit of demonstrative geometry during the last part of Grade IX, or for the geometry work of the tenth grade; and the work in trigonometry, which is now being generally included as part of ninth grade algebra, gives the pupil an excellent idea of indirect measurement.

*Work of the Tenth Grade.* The central feature of this year is the fundamental elements of plane and solid geometry. If a pupil has had the general mathematics course of the ninth grade described above, he is familiar with a large number of definitions and concepts that will form an excellent basis for the work of the tenth grade.

Algebra and trigonometry should be used wherever they help to clarify the proofs. Trigonometry correlates well with intuitive geometry and algebra, but not with demonstrative geometry. Just to the extent to which it is permissible to introduce mensuration, just so far is it feasible to introduce trigonometry into demonstrative geometry. Both mensuration and trigonometry may have a place at this time for the purpose of changing the emphasis and of providing the pupils with a mental rest from the pursuit of logical demonstration.

*Work of the Eleventh Grade.* For those who continue the study of general mathematics through the eleventh grade the course should be built up around algebra, trigonometry, and the simpler elements of analytic geometry as the central features. Some teachers may prefer to introduce the calculus by this time or even earlier. And there is no reason why this should not be done in certain schools. The following outline for the work of this grade is meant to be merely suggestive of the general field and not of the order of presentation:

I. Dependence
   1. Meaning of dependence,—functional relationship.
   2. Review and extension of the earlier work on algebraic functions.
   3. Trigonometric functions as examples of transcendental functions.
   4. Functional notation.
   5. Evaluation of functions.
   6. Determination of functions.
      *a.* From empirical data and tables.
      *b.* Empirical *vs.* arbitrary functions.
   7. Classification of algebraic functions.
   8. Graphs of algebraic functions.
      *a.* Variation of function.
      *b.* Graphical introduction to maxima and minima.
   9. Fundamentals of statistical method.
      *a.* Theory of measurement.
      *b.* Fundamental ideas.
      *c.* Applications.

II. Trigonometric Functions of Any Angle.
   1. Review and extension of the earlier work.
      *a.* Ratio definitions, including secant, cosecant, and cotangent.
      *b.* The right triangle where the acute angle is 30°, 45°, or 60°.

*c*. Similarity of triangles. No trigonometric function of a given acute angle has more than one value.

*d*. Given the value of a trigonometric function of an acute angle $A$, to construct $A$ and determine the other trigonometric functions.

2. Changes in the functions of $A$ as $A$ increases from 0° to 360°. Graphical introduction.

3. Positive and negative angles of any size.

*a*. Angles whose initial sides and radius vectors are respectively identical.

*b*. The signs (quality) of the functions of angles in the various quadrants.

4. Functions of $(-A)$ in terms of $A$.

5. Functions of $n \times 90° \pm A$, $n \times 180° \pm A$, and $n \times 360° \pm A$.

6. Line definitions of the trigonometric functions.

*a*. Graphical representation.

*b*. Application to wave motion, electricity, and the like.

7. Table of natural functions.

8. Applied problems.

9. Fundamental trigonometric relations like

$$\sin x = \frac{1}{\csc x} \text{ and } \tan x = \frac{\sin x}{\cos x}.$$

*a*. Proving identities.

*b*. Applications to physics, navigation, and surveying.

III. Logarithms and Applications.

IV. Solution of Triangles.

1. Right triangles.

2. Oblique triangles.

3. Applications.

V. Identities.

1. In elementary operations.

*a*. Work on functions extended.

*b*. Use of analytic method, especially in proportion.

*c*. Factoring.

(1) Review and extension of earlier types.

(2) Factor theorem.

(3) Factors of $x^n \pm y^n$

(4) Mathematical induction.

2. In formulas.

*a*. Review and extension of earlier work.

*b*. Addition and subtraction theorems of trigonometry.

*c.* Trigonometric functions of $2A$ and $\frac{A}{2}$.

*d.* Applications of *b* and *c* above.

(1) In evaluating certain functions.
For example, $\sin 75° = \sin (45° + 30°) = ?$

(2) In proving certain identities.

VI. Straight-Line Formulas.

1. Distance formula.
2. Mid-point formula.
3. Slope of a line, parallel lines, a perpendicular.
4. Point-slope form.
5. Slope-intercept form.
6. Two-point form.
7. Two-intercept form.
8. Distance from a point to a line.

VII. Equations.

1. Linear.
2. Quadratic.
   *a.* In one unknown.
      (1) Maxima and minima.
      (2) Radical equations.
   *b.* In two unknowns.
   *c.* Theory of quadratic equations.
3. Trigonometric.
   *a.* Radian measure.
   *b.* Two acute angles are equal if any trigonometric function of the one is equal to the same function of the other. Explanation of how the value of an angle is obtained and thus how to solve a trigonometric equation.
   *c.* Solution of trigonometric equations.

VIII. Series.

1. As an example of an identity.
2. General nature.
3. Classes to be considered.
   *a.* Binomial Theorem.
   *b.* Arithmetic.
   *c.* Geometric.
4. Applications.

IX. General Number System.
1. Integers.
2. Fractions.
3. Negative.
4. Surd.
5. Simple imaginaries.

*Work of the Twelfth Grade.* There is no reason why pupils who wish to elect general mathematics in the twelfth grade should not be provided with a suitable course in the high school. In a four-year high school, in which the writer taught mathematics, slightly over 25 per cent of several entering freshman classes elected four straight years of general mathematics. There is probably no best course and a great deal of experimental investigation should be carried on, but the writer offers the following outline as a suggestion for such a course:

I. Variation of Functions.
1. Graphical representation of functions, to bring out variation of different kinds.
*a.* Mechanical graphs like Weather Bureau records.
*b.* Review of details in graphic work, scales, and the like.
2. Mathematical method of studying functions.
*a.* Who makes such study? Illustration.
*b.* Why such study is not made of all existing functions.
3. Review of functional notation.
4. Directed lines. Rectangular coördinates.
*a.* Intercepts.
*b.* Infinitely large or infinitely small functions.
5. What is meant by a rate.
*a.* Rate of change of a function.
*b.* Uniform rate of change of a linear function.
(1) Slope of a straight line $y = mx + b$.
(2) Uniform acceleration.
(3) Applications.
*c.* Average rate of change of a function.
*d.* Instantaneous rate of change of a function.
*e.* Graphic methods involving *a*, *b*, *c*, and *d*.
*f.* Small intervals.
*g.* Interpolation by proportional parts.
6. Important problems.
*a.* Mean-value.

(1) Average value throughout a certain interval.
(2) Applications.
(*a*) To find the distance traveled.
(*b*) In physics.
(*c*) In geometry.

*b*. Extreme-value.
(1) Review and extension of maxima and minima.
(2) Applications.

*c*. Zero-value.
(1) Review of earlier equation work with emphasis on the idea of variation.
(2) Review of graphic methods of solving simple equations and extension to the solution of higher equations.
(3) Theory of equations.
(*a*) Number of roots.
(*b*) Location principle.

7. Deriving formulas.

II. The Notion of a Limit.

1. Elementary notion.
*a*. Numerical.
*b*. Geometric.
2. Tied up with instantaneous velocity.
3. Instantaneous direction.
*a*. What a tangent line is.
*b*. Slope.
4. Explanation of limit.
5. Explanation of notation used.

III. Differentiation and Its Applications.

1. The idea of a derivative of a function.
2. What $\frac{dy}{dx}$ means.
3. Differentiation of simple functions, formulas.
4. Maxima and minima.

IV. Integration and Its Applications.

1. Integration explained.
2. Formula for integration.
3. Notation.
4. Applications to areas, surface, volumes.
5. Other applications.

V. Commercial Algebra.
  1. Review.
    *a*. Exponential and logarithmic functions.
    *b*. Growth curves.
    *c*. Compound interest.
    *d*. Annuities.
    *e*. Business depreciation.
    *f*. Differentiation and integration.
  2. Series.
    *a*. Evaluation of functions.
    *b*. Mathematics of investment.
      (1) Accumulation.
      (2) Life insurance.

VI. Permutations, Combinations, and Probabilities.
  1. Permutations.
  2. Combinations.
  3. Chance explained.
  4. Simple and compound probability.
  5. Normal distributions, surfaces and curves.
  6. Errors of measurement.
  7. Applications.
    *a*. Life insurance problems.
    *b*. Mendelian theory of inheritance.

VII. The Number System Extended.
  1. Review and extension of the real number system.
  2. Similarly for imaginary numbers.
  3. What a complex number is.
  4. Polar form of a complex number. Polar coördinates.
  5. Applications.

# THE FOUR GOALS OF HOME ECONOMICS TEACHING

By DAVID SNEDDEN
*Professor of Education, Teachers College*

FOR convenience let us use the term "home economics" to cover all the knowledge, arts, and appreciations which, deriving from the maintenance of homes, the domestic rearing of children, the conduct of home-centered productive processes, and the relation of homes to other social agencies, can or should be taught in schools.

2. In this sense we can teach some "takings from" the general subject of home economics in kindergartens or in colleges. We can teach them to male or female students. But, most important, we can teach them toward any one of several purposes or types of social functioning.

3. *General Problem.* Are there different goals to be reached or purposes to be served by home economics teaching so unlike each other that failure sharply to distinguish these purposes as well as their appropriate means and methods not only impairs or even nullifies the effectiveness of well-meant teaching effort, but even results in counter-education—that is, the production of attitudes and valuations adverse to the normally wholesome appreciations that would have "grown" if we had done no school educating in this field?

*Hypothesis:* It is the contention of the present writer that there are at least four such distinct purposes or possible general objectives of home economics teaching, and that failure to distinguish them and their appropriate methods is at the bottom of much of the confusion which attends present-day efforts both to define concrete objectives in that field and to make teaching actually function.

4. *Specific Problem.* What are or should be the unlike major objectives in the field of home economics for schools as diverse as kindergarten and liberal college, as junior high school and vocational preparatory and extension classes for mature women?

*Hypothesis:* The hypothesis is submitted that these should be at

least four: (a) Developmental (play or amateur level) for girls from two to (under American conditions) fourteen or fifteen years of age. (*b*) Cultural (work level, projective) for girls and women from fifteen to twenty-five years of age. (*c*) Vocational preparatory or extension for some girls fifteen to twenty and for many women eighteen to thirty years of age. (*d*) Personal regimen (which is not inherently of the field of home economics at all, but for the present must be placed there for reasons of expediency) for girls and women from fourteen to thirty on the eve of any momentous departure into novel living environment.

5. *Problem.* What should be the primary objectives of developmental education in home economics? And how are these related to vocational, projective cultural, and personal regimen objectives?

*Hypothesis A:* The primary purpose of developmental home economics should be to extend and enrich the experience of children, more particularly girls, in that area of their environment which centers in the home. This purpose is pedagogically closely analogous to the purposes, for these ages, of moderate travel, general reading, scouting, miscellaneous play, moving picture attendance, camp life, and (properly considered) "nature study."

*Hypothesis B:* Any considerable attempt between ages two and twelve (at any rate) to integrate other purposes (correlation with arithmetic, preparation for later vocation, contributing to cultural projective home economics) will be corrupting and nullificatory of the original developmental purpose which at this age level is the only valid one to control in course-making in this subject.

*Hypothesis C:* For optimum realization of developmental purposes formal courses or even regularized sequences of units are very undesirable. Better regard it all as a matter of sampling—the school to supplement home dolls and beds and "when mother lets us cook" with other and novel experiences, projects, pictures, etc. Correlation, and even the general project method are in danger of becoming bugbears here. (But many of the units of instruction should be specific projects—in sewing or cooking or other performances for their own sake.) Much flexibility, much utilization of childish impulses, very little drill, the least possible of regimentation here. Don't expect vocational outcomes any more than we should expect tangible vocational outcomes from playground games or dolls. Don't cor-

rupt good developmental scouting or playing with dolls by intruding arithmetic or even needlecraft—if that is thought needed so early.

*Hypothesis D:* When optimum provision has been made for developmental objectives, there will be incidental occasional contributions effected for the later purpose of vocational training, projective culture, and personal regimen. But those should be expected only as accidental or incidental by-products.

6. *Problem.* What should be the primary objectives of projective cultural home economics for girls and women from 15 to 25 years of age?

*Hypothesis A:* The primary purpose here should be to produce an extensive and varied range of appreciations—including insights, attitudes, ideals, valuations—which are expected to be of cultural and social service to the learners in the fifty adult years to come. These appreciational products of learning should be regarded as closely analogous to the appreciational products expected by progressive educators from wisely directed study of literature or general science, from intelligent teaching of art (musical or plastic) appreciations, from travel or from interested reading of the world news of the day.

Appreciational objectives are far different from performance objectives. In the course of acquiring performance powers in any field—dressmaking, piano-playing, short-story writing, primary school teaching or gardening—one acquires, of course, many intense, even if narrowed, appreciations. But it may take home economics and plastic art teachers a long time yet to learn what the best teachers of music and literature appreciation already know—namely, that incipient and simulated performance methods may easily become very wasteful, even useless, as means of teaching varied and superior appreciations.

*Hypothesis B:* The best *methods* of giving appreciational education are still hidden even from teachers of aesthetic arts, literature, general science, and history. Clearly, however, exact knowledge and specific habituations play but secondary rôles in such methods. Clearly, too, vivid and enthusiastic personalities of teachers, including fellow students, count for much. Genuinely high grade projects in home economics are certainly of worth if the true amateur spirit is preserved. So are home visiting, vivid oral interpretations, vision getting via dramatic reading.

*Hypothesis C:* Not many American girls between 15 and 18 can be expected to be physiologically or psychologically motivated to learn a homemaking vocation. But there is every reason to believe that they are then amply motivated for genuine projective cultural courses centering in homes, households, families, household production—including these agencies as of peoples of far different economic or cultural stations for themselves. Hence for these girls, in high or continuation schools, or liberal colleges, the most profitable courses in home economics should parallel in basic purpose the most profitable courses in literature, social science, natural sciences, current events, art appreciation.

*Hypothesis D:* Very well-taught courses in projective cultural home economics should be expected to produce very few and only unimportant *technical* proficiencies—any more than good appreciational courses in literature prepare directly for news reporting or short story writing. But they should usually lay foundations of deep and broad *motivation* for the vocational homemaking courses to be taken later.

7. *Problem.* What should be the objectives of vocational preparatory or extension education in the home economics field?

*Hypothesis A:* Fundamentally and all the time, to prepare the individual in the shortest time and most effectively for the *performance* of wage-earning domestic services or of conjugal homekeeping services at the economic and cultural level the individual is most likely to fill.

*Hypothesis B:* Since it is very difficult to procure good vocational education without intense and conscious vocational motivation, we should not expect to find any readiness to take on true vocational education under the age of twelve; and from twelve to fifteen we should expect it only on the part of those few girls (under American economic conditions) who thus early feel the heavy pressure of need either because of breakdown of mother or failure of family income. From fifteen to nearly twenty we should expect to find strong homemaking motivation only on the part of that minority (in America) of girls who are not already strongly motivated to enter soon into wage-earning, non-homemaking work or to go to higher institutions of learning. If wage-earning domestic service were in a happier social state, perhaps ten per cent of girls fifteen to eighteen could

find appealing vocational objectives in that field; but that is not to be expected yet. Some girls of this age are both motivated for, and needed as, mothers helpers. For these, vocational homemaking courses should be made available, paralleling general education at ages fifteen to eighteen, or, perhaps preferably, succeeding intensively to general education at fifteen, sixteen, seventeen, or later, according to the completion of the learner's capacity (including desire) for systematic general education.

*Hypothesis C:* The normal time for vocational homemaking education toward conjugal family homemaking for normal family life is after betrothal or within the first year after marriage, from the standpoint both of maximum motivation and of least wasteful adaptation. (It is here always assumed that a "normal" family means from three to five children, claiming much of the mother's time for the twenty years following the first year of married life.) If good preparatory vocational training were given at this time, later extension courses would be needless or but slightly necessary. It is highly probable that twelve weeks of intensive vocational training (forty-eight hours, weekly) just before or just after marriage would serve eighty per cent of the needs now clearly analyzed; whilst twenty-four weeks would give a finished competency comparable to that now shown by the graduate of a good vocational (nurse training, carpentry, dental) school in other fields.

*Hypothesis D:* If home economics leaders were to unite in urging states and local communities to provide facilities for the kinds of education here suggested and, through school cultural courses and other publicity, in urging girls to plan vocational preparation in homemaking in conjunction with marriage, it would not be long before large proportions of American young women would be taking such training in the same spirit that American teachers now come to summer schools.

8. *Problem.* What should be the primary objectives of personal regimen courses?

*Hypothesis A:* Primarily to prepare individuals for best living (utilization, not production) under conditions of greatly changed environment.

*a.* When, for example, a girl of sixteen first becomes a wage-earner in factory or office, away from home all day, a host of fairly

novel conditions confront her. She will have some meals away from home. She will make many new acquaintances, some new intimate friendships. She will have need and opportunity for much buying of clothes and decorations. She may or may not save. She may or may not continue to help her parental household. She can continue her cultural growth wisely or unwisely. Especially can she conserve her health well or badly. For all these contingencies she can in some degree be prepared by specially adapted education.

*b.* The "findings" of home economics teachers contribute but a minor quota to the foregoing. But physical educators, trade school teachers, or social science teachers are in no position yet to organize personal regimen courses. Hence we are justified in asking home economics teachers (perhaps inspired by the ideals of the new "euthenics") to take over this work.

*c.* Careful study of school personnel of distinctive case-types may reveal substantial need for several personal regimen courses. For example: (a) Junior high schools in poor parts of cities, for girls of inferior intelligence likely soon to enter factory work. (b) Senior year in high schools, for girls likely to enter educational institutions away from home. (c) Others.

*Hypothesis B:* Good personal regimen instruction and even training should not be regarded as of more than slight and incidental value either for later homemaking vocations or for home economics cultural education.

9. *Problems of Home Correlation. a.* Children from two to fourteen years of age are, commonly, very much "home-centered" or, better, household-centered. Hence developmental home economics short courses or units can and should use each child's background of household experience abundantly as means and methods.

Should this work also include purposes of "better fitting of the child to its (parental) home environment"? Perhaps, yes, if there is not too much of self-consciousness, and formalization. Only some parents are so remiss in their own homemaking powers or senses of responsibility as to need seriously the help of home economics specialists.

*b.* From fifteen onward American young women are usually swayed by instinct and strongly urged by the herd-spirit of their sets progressively to detach themselves from home-centered occupa-

tions, parental controls, and household "domestication" and henceforward "to live their own lives," to be "mistresses of their own souls." Hence delight in boarding schools, in wage-earning extra-home work, in formation of extra-household "sets." Much of this is certainly normal, but it could not become "functional" in barbarous or old custom-ridden societies, hence becomes the "new freedom" of American girls, especially in families of superior economic position.

To try to use home economics cultural or vocational education with girls fifteen to twenty "to teach them to live better in their own (parental) homes" seems equivalent to trying to make water run up hill. Water can be forced up hill but it will not run that way.

This is a very different matter, of course, from using any girl's realistic household experience as basic to method in preparing her for any other objectives that may be established.

# SOME ASPECTS OF BUDGETARY PRACTICE IN LOCAL SCHOOL SYSTEMS

By N. L. ENGELHARDT
*Professor of Education, Teachers College, Columbia University*
AND FRED ENGELHARDT
*Professor of Education, University of Minnesota*

A SOUND budget is necessary for the efficient management of a public school system. In its narrow sense, the budget is frequently conceived as a statement of future income and expenditure. In the more recent and broader concept, the budget concerns itself with the anticipation of the needs of the educational program previous to the time of expenditure and expresses such needs in direct relationship to the plant and fiscal problems which may be expected to develop. In the budget, there should be included a work plan, a financing plan, and a spending plan. Business management in education is not alone in the realization of the importance of future planning. McKinsey and Meeck,[1] in speaking of progress made in budgeting in private business, say:

> The relatively late development in business of careful planning for the future, the use of some sort of a system of budgeting, is still confined to relatively few business units.

Definitions of a budget vary. Twente[2] in his study of budgetary procedure in public schools uses Cleveland's definition, which is—"A budget is a plan for financing an enterprise or government during a definite period. . . ." Kinkade[3] states that:

> The construction of a budget is nothing more nor less than an estimate of the expenses of remaining in business during the year for which the budget is compiled.

[1] McKinsey, J. O. and Meeck, S. P. *Controlling the Finance of a Business.* p. 7. Ronald Press, 1923.
[2] Twente, J. W. *Budgetary Procedure for a Local School System.* p. 1. (Out of print.)
[3] Kinkade, A. *Public School Fiscal Records from the Viewpoint of the Auditor.* p. 130. Twelfth Annual Proceedings, National Association of Public School Business Officials, 1923.

Daley[4] suggests that:

> The first step in school accounts is the preparation of the budget, which is a device to give the representatives of the people control over the administrative officers. The citizens of the community delegate their authority to the representative body, that is, the Board of Education. They in turn delegate the actual work to the executive officers. As a check on these officers, the representative body, usually through the Finance Committee, adopt a budget which specifies how much money each department will be allowed to expend during the fiscal year.

Pittinger[5] tends toward simplicity in his definition. He says:

> The budget, then, is only a "complete financial plan for a definite period which is based upon a careful estimate of expenditures to be made and of probable income." Its objects are to keep expenditures within income, and to apportion available funds among the different objects of expenditure so as to accomplish the most good. Instead of being intricate, the simpler the form that the budget can take, the better; and instead of being a mysterious feature of financial operations on a large scale, it is the plain result of applying sane, matter-of-fact intelligence to the problem of planning expenditures, whether large or small.

These definitions indicate a wide range of purpose and function in the budget. Simplicity and ease of administration are aims of management which should be kept foremost. However, the results which should be secured from a thoroughgoing budgetary procedure should not be sacrificed to them. A budget is not merely a financial statement, nor a device brought to the fore at a particular period in the year. It loses its significance except as it serves the administration in securing better educational results.

It is obvious that any educational plan projected into the future requires an anticipation of the service demands, approximations of achievement, and estimates of plant material and supplies needed, as well as the cost of these articles and the income from all sources. The fact that the budget involves prognostication immediately brings to the front a large number of variables, the control of which within certain limits is essential if the budget is to be significant in the administration of a school system.

[4] Daley, R. L. *School Accounting Officers and Relations to the Preparation of the Budget.* p. 63. Fourteenth Annual Proceedings, National Association of Public School Business Officials, 1925.
[5] Pittinger, B. F. *An Introduction to Public School Finance.* p. 46. Houghton Mifflin Co., 1925.

### STANDARDS ESSENTIAL TO BUDGETARY CONTROL

Basic to an intelligent budgetary control are standards for service requirements and production; for service and material payments; for consumption, quality, and use of materials and supplies; and for plant needs. The more accurate the unit of measure for each of these elements, the more valuable and reliable the estimates of need will be and the more efficient and extended will be the service rendered by the schools. Future service demands must be measurable in terms of an accurate measure of school population growth, and the offering to be provided in the classroom. Salary schedules and the policies to be followed in the selection of the personnel determine largely the amounts to be budgeted for this item. Material and supply needs must be anticipated on the basis of predetermined standards of quality, consumption and use.

### CYCLIC ASPECTS OF BUDGETARY CONTROL

Budgetary control is impossible without considering past performance, present conditions, and future possibilities, and hence has frequently been considered as having a cyclic movement.[6] In reality, the budget is a continuous affair in a going concern. Because taxes are levied each year and the spending program in governmental business is usually approved for a twelve-months period in advance, the budget has been conceived generally as an annual affair. A budgetary program involving its anticipation, preparation, approval and operation is, however, cyclic in nature. As a single class recitation is but one part of a well-planned year's work, so the annual budget in all its aspects is but one part of the continuous plan for operating a public school system. The debt program must be budgeted for a period of years in advance sufficient to anticipate payments in full, in spite of the fact that only a small amount of the whole debt may be paid in any one calendar year. The school building program and the budget for construction and maintenance must be projected as far in advance as scientific planning may permit. The annual budget thus becomes but a part of a projected plan which is continuous in nature, just as each day, month, or fiscal period becomes a unit in the business transactions of any one budgetary year.

[6] Emerson, W. *School Budget and Budgetary Procedure.* Bulletin reprint from *American School Board Journal.*

### BUDGETARY CALENDARS

To facilitate the preparation of the budget, a calendar of the things to be done, by whom they are to be done, and when they must be done has been found to be very helpful. The following chronological register has been adapted from one prepared by a group of students in the field of administration.[7] It is submitted here primarily because of the possibilities it suggests. Such a procedure cannot be standardized for all school systems, but must be developed for each organization after a careful study of the local problem.

### OTHER GENERAL ASPECTS OF THE BUDGET

The preparation of a budget may be thought of in the broader sense as requiring a comprehensive understanding of the function and responsibilities of public education. Before a financial statement estimating the future income and outgo can be prepared, the educational program which is to be must first be determined[8] and approved. This educational program is not one set up merely for the next ensuing year, but it must be carefully thought through for a long time in advance. It is this aspect of budgetary preparation that requires effort, skill, scientific knowledge and leadership conversant with educational affairs. Each aspect of the educational program must be planned in relationship to every other, and the policies that are to be carried out must be planned in detail, and affirmed by the school board. To a going concern, which must be organized to operate continuously irrespective of the economic cycles, the budget must have more than a current significance.

The educational program, its objectives and its organization having been definitely conceived, the plan of financing must likewise be clearly thought through. To the degree that the educational program cannot be considered as an isolated unit, so the financial plan and policy must not be developed for one year alone.

Although tradition leaves the impression that public school programs begin and end within a calendar year, educational trends are rapidly changing this concept. The financial program may be set

[7] Adapted from calendar prepared by the following students in administration: J. A. Anderson, H. C. Davis, M. G. Carpenter, R. H. Hicks, L. X. Johnson and J. L. Foust.

[8] Moehlman, A. B. *A Scientific Budget for City School Districts.* p. 139. Twelfth Annual Proceedings, National Association of Public School Business Officials, 1923.

BUDGETARY CALENDAR OF SCHOOL DISTRICT No. X

| Date | Item | To be Performed by |
|---|---|---|
| Monthly | The monthly fiscal budgetary statements must be submitted to superintendent five days prior to the meeting of the school board meeting. Each board member is to receive his copy along with the superintendent's report three days prior to meeting. | Assistant superintendent<br>Superintendent |
| Summer months to Nov. 1 | A complete analysis of all data available must be made in regard to future needs in order that budgetary estimates can be intelligently forecast. | Assistant superintendent<br>Bureaus of Research |
| | The changes in the educational program which will require additional funds must be carefully planned and presented to public and school board for consideration and approval. | Superintendent |
| | Calendar for fixed charges and debt payments to be checked and corrected for the new year (Jan. 1–Dec. 31) | Assistant superintendent |
| Nov. 1 | Committees appointed to determine standards of supplies to be used, and textbooks to be selected. To report not later than January 15. | Committees appointed by superintendent |
| Dec. 15 | Tentative maintenance budget for ensuing year submitted to each principal for review and check. Conference with assistant superintendent in regard to same must be arranged prior to January 15. | Assistant superintendent in charge of business affairs |
| Jan. 15 | Estimate of equipment needs for building in operation must be submitted, individual maintenance budgets approved and submitted. | Principals<br>Supervisors<br>Department heads |
| Jan. 15 | Tentative salary and supplies budget submitted to principals, supervisors, and directors. | Assistant superintendent |
| Jan. 30 | All budgetary requests and approvals of tentative estimates must be in hands of assistant superintendent in charge of business affairs. | Superintendent<br>Principals<br>Supervisors<br>Department heads |

BUDGETARY CALENDAR OF SCHOOL DISTRICT No. X—*Continued*

| Date | Item | To be Performed by |
|---|---|---|
| Feb. 15 | Complete tentative budget prepared in office of assistant superintendent. To be submitted to superintendent for review. | Assistant superintendent |
| | General publicity materials, and news items relative to budget prepared. | |
| Mar. 1 | All new projects for ensuing year must have been presented to school board for consideration and approval prior to this date. All teachers not to be re-employed must have been notified. | Superintendent |
| Mar. 12 | Copies of tentative budget submitted to board members for consideration at regular meeting on the 15th inst. | Superintendent |
| | Equipment, supply and textbook list made ready for bids. | Assistant superintendent |
| Mar. 15 | Budget acted on by board at its regular meeting. | School board |
| Mar. 15-22 | Contracts sent out to be returned by April 1. | Teacher<br>Other employees |
| | Budget adjustments made and staff members concerned notified of change. | Superintendent |
| | Plans made of certificate of tax levy to county commissioner. | Assistant superintendent |
| Mar. 15-22 | Specification forms filled out for all items. | Assistant superintendent |
| | Specification forms mimeographed or printed and publication of same with notice to bidders in newspapers. | Assistant superintendent |
| | Printed specifications sent out to bidders. Board of education to guarantee to buy from 90 per cent to 110 per cent of estimates. | Assistant superintendent |

BUDGETARY CALENDAR OF SCHOOL DISTRICT No. X—*Continued*

| Date | Item | To be Performed by |
|---|---|---|
| Mar. 15–Apr. 8 | Bidders prepare and submit their bids to assistant superintendent for approval. Bids to be accompanied by substantial deposit. | Bidders |
| Apr. 1 | All contracts returned, or adjustments made. | All employees |
| Apr. 10 | Bids considered publicly. | Board of education |
| Apr. 11-15 | Bids tabulated and inspected; samples approved. | Assistant superintendent |
| Apr. 11-14 | Samples marked by a key number; trade marks, names and labels detached. Samples mounted and otherwise prepared for selection by committee on supplies. | Assistant superintendent |
| Apr. 14-16 | Inspection and selection of supplies by committee on supplies. | Committee on supplies |
| Apr. 17 | Samples wrapped, labelled, and turned over to assistant superintendent. | Committee on supplies |
| Apr. 18 | Selections approved and signed by assistant superintendent. | Assistant superintendent |
| Apr. 18 | List made of successful bidders by items, giving price at which bid was let. | Assistant superintendent |
| Apr. 19 | Lists printed. | Assistant superintendent |
| Apr. 26–May 1 | Lists submitted to board of education for approval. | Assistant superintendent |
| May 1 | Approval of lists. | Board of education |
| May 2 | Contracts made out in triplicate and sent to proper board of education officers for signatures. Two contracts are for the vendor, one for principal. These are sent out. If more preferable, one copy may be for assistant superintendent, one for board of education, and one for the contractor. Where supplies are sent directly to schools, contracts are quadruplicate. | Assistant superintendent |

BUDGETARY CALENDAR OF SCHOOL DISTRICT No. X—*Continued*

| Date | Item | To be Performed by |
|---|---|---|
| May 3 | Deposits of bidders to be released and returned to them. | Assistant superintendent |
| May 3 | Contracts to be returned to assistant superintendent on this date. These to be accompanied by a surety bond for all contracts over $250. Bond to equal one-half of order. | Bidders |
| | Orders placed as needed where this is satisfactory to vendor and order is placed in same city, causing no extra delivery charges; otherwise, orders are placed immediately and placed in central store house. Store house stock subject to requisition as needed. Direct deliveries F.O.B. to schools. Such orders to require quadruplicate orders,—the extra one for the school. | Assistant superintendent |
| | Payments *prompt*. Invoices from vendor to assistant superintendent. Voucher made out by assistant superintendent and sent to vendor. | |
| | Emergency purchases bought on open market as needed. Orders from assistant superintendent in triplicate or quadruplicate. Quadruplicate where sent direct to schools. Invoices and vouchers handled as above. | Assistant superintendent or superintendent checks petty cash |
| May 15 | Complete calendar for summer maintenance program submitted to superintendent for approval. | Assistant superintendent |
| May 15–June 1 | Maintenance material and supplies as well as contracts for summer repairs completed. | Assistant superintendent |
| July 1 | Summary of fiscal statements made showing budgetary estimates and actual receipts and expenditures. Similar summaries of estimates of needs; for example, pupil increase and teacher increase related to actual occurrences. Data prepared for subsequent use. | Assistant superintendent and superintendent |

up to cover a calendar year, yet the year's program must be planned as one unit in the continuous whole.

## INCOME BUDGET CONSIDERATIONS

The financing of the educational program for a period of years requires specific information regarding income. The important bearing of accounting control of income is at once apparent as the income budget is prepared. A check list of all sources of receipts should be prepared, and tables showing the amounts received from each of these sources in contrast with the yearly estimates should be available. The following questions raise important considerations in the preparation of this part of the annual statement:

1. Can all the revenue be expended for all purposes?
2. What effect does the economic cycle have on local tax rates?
3. What is the trend in property assessment?
4. What policies prevail regarding payment of state aid?
5. Can loans be secured at minimum rates at all times?
6. Do bank balances draw maximum interest at all times?
7. Has the purchase program been coördinated with income receipts?
8. Are the periodic cash requirements adjusted as near as possible to income?
9. How does the tax levy compare with the tax income?
10. Are the reserve, loan, and interest requirements carefully and economically planned?
11. Are all revenues for all special and trust funds properly accounted for and considered?

The proper solution of each of these questions has an important bearing on the income budget. Revenue, which must be specifically applied to certain specified objects, must be related to the spending program for that project. Periodic and total cash needs must be determined in order that the final local tax burden can be estimated.

## TENTATIVE EXPENDITURE BUDGET

It is equally convenient for the administrative staff to have a complete check list of all items of expenditures in order that no item will be overlooked in the preparation of an annual tentative expenditure budget. There are a number of questions which the execu-

tive must be prepared to answer in regard to the tentative estimates. The following are some examples:

1. If modifications or revisions are to be made, where can they be made with the least loss in the effectiveness of services performed by the schools?
2. What information is essential to demonstrate and substantiate the point of view taken?
3. Are all the administrative policies and practices sound and justifiable?
4. Are all standards meeting the test of actual practice and use?
5. Are store balances adequate and economical?
6. Is advantage taken of discounts and market conditions?
7. Are salary schedules operating effectively to retain competent members of the staff?
8. Is the debt program well administered and are policies pursued economically sound?

### BUDGET AND PLANT PROGRAM

The budget serves admirably in correlating the plant program and the current educational program. The administrative staff must justify the conditions through the budget:

1. Is property available being used at a maximum consistent with efficient service?
2. Are property values being adequately preserved?
3. Are the plant facilities adequate?
4. Is the plant program working out satisfactorily?
5. Are equipment standards effective and efficient?
6. Is obsolete property being reclaimed?
7. Is insurance adequate?
8. Are debt policies sound and is debt program administered properly?
9. Are interest payments too large and interfering with current needs?
10. What new bond issues will be required? Will they meet with public favor? Can the community afford them? Is the redemption plan carefully correlated with outstanding debts?
11. Are all essential facts available to justify the additions to the budget?

The budget as an annual financial statement is no doubt one of the most important statements made by the school superintendent. It requires a carefully prepared check list and guide. Budget preparation is an arduous task and every effort should be made to simplify procedure and to insure the greatest accuracy, and the most reliable estimates.

In reality, a scientifically operated budget is in constant preparation for checking, alteration, and revision. Each element of administration and management is a part of it since the whole purpose of the school is to render efficient service. The tentative budget for any single fiscal period is a part of the whole set aside specifically to enable the administration to analyze the total situation, to check achievement with estimates, and to further improve the working machinery. The budget cannot be conceived apart from the normal operations of the system.

## BUDGETS FOR INTERNAL ACTIVITIES

Annual budgetary statements should be prepared or required for all activities in which the schools are engaged. Statements for all the extra-curricular activities and internal services should be prepared uniformly and in advance. This measure not only is essential in the administration of the schools, but becomes an important factor in the education of children. The school authorities should be informed in advance of plans contemplated in organizations within the system. This should be required in the interest of both the pupil and the school.

## RESPONSIBILITY FOR THE BUDGET

A consistent application of sound administration principles will place on the superintendent of schools the responsibilities for the preparation, the validation, and the operation of the budget. The school board, however, should approve the budget as it does other policies or administrative acts. The following statement illustrates the results of a failure to apply this fundamental principle:[9]

Heretofore, the St. Louis Board of Education has made an apportionment to each department, usually by object and widely segregated. The idea underlying the apportionment to departments is, of course, to fix the responsibility of

[9] Daley, R. L. *School Accounting Officers and Relations to the Preparation of the Budget.* p. 66. Fourteenth Annual Proceedings, National Association of Public School Business Officials, 1925.

the Executive of that department for living within the appropriations apportioned him. This responsibility cannot, however, be insisted upon (in the case of the St. Louis Board of Education at least) for this reason, which the Supply Commissioner and Commissioner of School Buildings have from time to time explained. The Superintendent may and does unexpectedly to these other offices inaugurate or revise a course of study which calls for additional or new equipment, texts and supplies—perhaps for the remodeling of a building. Thus, an unforeseen charge against the appropriations of the Supply or Building Department is made for which these Executives may fairly disclaim responsibility.

Since the administration of the budget is associated with the current operations of the school system, budgetary responsibilities may be delegated, and the business office may be directly responsible for its preparation as in the case of all financial statements and reports.

### BUDGET REVIEW AND APPROVAL

In a fiscally independent school system, the tentative budget must be approved by the school board to become operative, and by the public to secure sympathetic and coöperative support. It may seem paradoxical to suggest that the public support of the tentative budget should be solicited and gained before the document is prepared, but it is especially desirable of all new projects. Public approval of the educational program is in reality the approval of the budget. A constant and continuous plan and program for enlightening the public in regard to school affairs preclude opposition and usually mean support of the budget when presented to the board for final approval.

The annual approval of the school budget by the board, except in emergency, should not be different from the approval of any other formal business document. The important details, in a well-planned organization, will already have had the approval of the board. The budgetary statement represents a recapitulation of the year's financial plan as a whole, the details of which are consistent with policies already established, and a service program which has met with the concurrence of the school board. The unusual and unforeseen will be the only new items which have not been clearly presented for consideration and approval.

The summary of the tentative budget with schedules and supporting statements should be prepared carefully in advance of the

meeting at which it is to be formally reviewed and approved. Copies should be in the hands of the school board in advance of this meeting if intelligent consideration is expected. Special statements concerning it should be prepared for the press, and care must be exercised that the necessary facts are available that questions raised may be answered intelligently and authoritatively by the superintendent at the meeting.

In a fiscally dependent school system, the school authorities must not only go through the above procedure, but must present the tentative budget to one or more reviewing boards or commissions, before the budget can be finally authorized. The authority and powers of the reviewing boards are varied, as Anderson [10] suggests:

> A number of cities now have boards of this general type, but they differ greatly in organization and in powers. Where they have been given adequate authority as in New York, they have again demonstrated the power of the purse by becoming practically the government of the city.

How these financial review boards operate can be illustrated more clearly by citing the following examples:

> In Springfield, the reviewing authorities are, in order: the Superintendent, the School Committee, the Finance Committee of the School Committee, the Finance Committee of the City Government, and the Civic Council. . . . From all practical consideration, however, the Springfield budget is a "Mayor's Budget" and is so recognized.[11]

> The following is a recurring situation in Springfield: The city government reduces approximately 45 per cent of the major items in the school budget; the total amount reduced over a five-year period amounts to only 3 per cent of the budget. Later in the year, as it becomes evident that the School Committee was actually better informed on the real needs of the schools than were the municipal authorities who diminished the items, the latter authorities grant, in supplementary appropriations, sufficient funds to equal or approximate what the School Committee asked in the first instance. There is no evidence that actual economics of any consequence were effected. In many instances, it is obvious that "cuts" were made merely to "even up" amounts. Large amounts were reduced more frequently than small amounts.[12]

[10] Anderson, Wm. *American City Government.* p. 515. Henry Holt & Co., 1926.
[11] Strayer, G. D., Engelhardt, N. L., *et al. Report of the Survey of the Public School System of Springfield, Mass.* Division of Field Studies, Institute of Educational Research, Teachers College, Columbia University, 1923-1924.
[12] *Ibid.* p. 97.

In Stamford, Conn., the developments are somewhat different, as shown by this excerpt from the school survey report:

A careful analysis of the changes which have been made as the budget has passed through the hands of the Board of Finance shows that 61 per cent of the total number of items presented in the budgets of the School Committee in the past five years have been reduced. The total reductions made in these five budgets have amounted to $199,535 or seven and four tenths per cent of the total amounts requested by the School Committee. . . .

In 1920-21 and in 1921-22, the School Committee each year asked for $1,550 for manual training. In 1922-23, they reduced this request to $200. In each of the three years, the Board of Finance refused to make any grants for manual training. It is evident that this latter Board is the authority which controls to a large degree the local program of public education.[13]

It goes without saying that a multiplicity of budgetary reviews destroys the principal purpose and function of such a document. The procedure will, in the long run, protect neither the interest of the taxpayer, nor of the public, nor of the school child. The ultimate result is confusion in the manifold complications arising out of the cumbersome procedure. The politician finds in it another means for covering up a multitude of petty ambitions, desires, and plans. The only logical procedure is for the public to set up a new situation in which the school board is given the final responsibility in the review of the budget.

### THE FORM OF ANNUAL BUDGETARY STATEMENT

The form, arrangement, and content of the budget, as in all other financial reports and statements, are important factors in considering its use and preparation. The preparation of this document even in a small school system is an arduous clerical task, and in a larger organization, the budget becomes a voluminous document.[14] To minimize labor, the forms to be used must be uniform and the classification and the arrangement of items on the forms should be consistent with the accounting classification used in the system. Budgetary forms cannot be standardized for all systems.

The following general principles should be considered for the arrangement and content of the reports and statements to be prepared in connection with the annual budget:

[13] Strayer, G. D., Engelhardt, N. L., *et al. Report of the Survey of the Public School System of Stamford, Conn.* p. 10. Division of Field Studies, Institute of Educational Research, Teachers College, Columbia University, 1923.

[14] The budget of the state of Pennsylvania is a printed document of 275 pages, while the budget submitted to the Wisconsin Legislature in 1923 consisted of over 300 typewritten pages.

1. Standard accounting classification of all items should be followed.
2. Summary statements should be made, to be followed by schedules giving detail and supporting evidence.
3. Forms of cumbersome and unwieldy size should be avoided. It will be convenient if budget forms conform to the minute book in size.
4. It should be typewritten, and one copy of the original tentative copy filed with all preliminary statements and requests.
5. All forms to be used by those submitting preliminary estimates should conform in arrangement and content with the master budgetary statements.

The statements to be prepared for the presentation of the budget may include the following:

1. The recapitulation showing the estimated summary of receipts and expenditures for major items for the new fiscal period.
2. A detailed statement of estimated receipts by source and a detailed statement of proposed expenditures by character and minor subdivisions.
3. Schedule showing details covering personnel, supplies, textbooks and equipment.
4. Statements setting forth clearly the justification for increases, decreases and new additions over those of the previous fiscal period.
5. Statements analyzing financial conditions. These statements must be in great detail and may stress financial aspects of current importance.

The Denver, Des Moines, Detroit, Cleveland and Duluth school budgets are splendid illustrations of desirable form and arrangement.

### PROCEDURE IN THE PREPARATION OF THE BUDGET

The larger the organization, the more complex become the problems connected with planning and preparing the annual budget statement. The mechanical routine in the preparation is in itself an important administrative function. In a small school system, the responsibility falls directly on the superintendent's office, and the competent executive will call to his aid the principals and teachers.

In the larger systems, the responsibilities must be delegated, and a carefully worked-out plan must be followed if the budget is to be economically and effectively prepared.

There are two general plans which can be followed in the preparation of the budget. It may be centrally prepared in practically all its details, and the estimates submitted to those responsible for the administration of organization units for consideration and check. On the other hand, directors, principals, and department heads may be requested to submit to the business office complete budget requests. The document is then prepared and submitted in the preliminary form to the superintendent. The tentative budget is then the result of many conferences with staff members, and the business office.

There are advantages and disadvantages in each of these procedures. The centralized plan is the most economical of time and energy. It presupposes a salary schedule, standards of quality, and use of materials and supplies. It likewise assumes that the central office is better equipped through centralized facilities and research service to determine school population growth. It is fair to assume that the office responsible for grounds and buildings has established a city-wide plan for the maintenance of plant. Under these circumstances, there is no doubt but that the preliminary budget can be more scientifically, intelligently, and economically prepared in the central office. Heads of departments, principals and supervisors can be asked to review that part of the preliminary document which concerns their school or department. The work can be checked, and modifications can be made when necessary after a conference. The initiative of staff members need not be disturbed in following this procedure if precautions are taken, and the proper attitudes are assumed in the central office. These dangers can be avoided if the educational program is the coöperative product of the whole staff, if standards for materials and supplies (in so far as they can be) are determined by those associated in their use, if salary schedules and their administration have the confidence and sympathy of the teaching corps, if the plant management is under the direction of a competent and well-trained assistant superintendent, and if the research service is efficient and sympathetic. Where teachers and staff officials are associated in determining curricula, standards and

policies, there is little to fear in the centralization of budget preparation and control, but much to be gained in efficiency, economy, and service.

## BUDGETARY CONTROL IN SCHOOL ADMINISTRATION

The administration of a school system for a fiscal period is regulated by the budget approved for that period. It becomes the guide to the executive staff in carrying on all the fiscal and indirectly the educational affairs of the school system. Fiscal powers of staff members are limited by the provisions in the approved budgetary document. It is important, therefore, that all officials associated with the administration of parts of the budget be informed of the finally approved allotments and the adjustments that may be required in the program where modifications in apportionments have been made. The statements of approved allowances act as the controls for each department or school. Thus a clear understanding is afforded from the beginning. The school board should exercise this same attitude toward the executive staff. The authority of the superintendent of schools for purchases and his responsibilities in the fiscal management should be limited to the budget. Through adequate periodic reports, the school board should be kept in close touch with the current financial conditions and the progress made. Modifications of the financial plan, when necessary, should be presented to the school board for action. This provides the only sound practice through which effective, businesslike management can result. The board is thus relieved of petty detail. Responsibility and accountability are thus definitely and explicitly placed on the executive and his associated staff.

## LIMITATIONS OF THE BUDGET

The budget is based upon estimates. This financial statement, prognosticated on the basis of available facts and administrative foresight and skill, will require, without question, some modification as the year progresses. Although the educational program and its associated financial plan set goals to be attained, it should be recognized that both have been anticipated in advance and will require change in view of further knowledge and unforeseen conditions. The executive who thinks that a large balance at the close of the year is

indicative of good management mistakes the purpose of the budget.[15] Conditions of this kind should have been anticipated and the money "saved" in the preparation of the document. It is equally true in cases where an overdraft results. Yet to go through the year and have expenditure and income exactly equal to estimate is mere chance, and where this occurs, the executive should not take unto himself undue credit.

The budget is not a perfect instrument and the spirit and attitude of the professional staff toward the administration of it will go a long way in its success or failure. As an instrument, the limitations and weaknesses should be noted and corrected in subsequent years, and in each fiscal period the financial plan should show improvement over previous plans both in its make-up and in its administration. The scientific research necessary objectively to improve the budget should have an ever-increasing value as an instrument in the general administration of the schools.

Great care should be exercised in the control of budgets of administrative units and departments. The intelligent and competent principal who, through skill and initiative, may find it possible either to improve his organization or to develop a more economical way to do a task should not be required in the interest of the general cause to lose the money saved. This frequently kills initiative. It is economical to set aside additional funds for the use of these officials who can produce results, or who have research ability and skill, or for those who have demonstrated their ability to set up an investigation worthy of support and encouragement. It is a short-sighted administration which denies itself these possible gains.

These limitations of the budget may be presented more directly and in briefer form as follows:

1. The budget is not a watch dog of the treasury.
2. The budget cannot be substituted for good administration.

[15] A peculiar and misleading conception of the budget is conveyed to the taxpayer by publicity of this kind:

"St. Louis county schools under the efficient supervision of the county superintendent will have a surplus of $50,000 remaining in the treasury at the end of the school year on July 31, according to the treasurer's report.

"The appropriation for the year was $725,000, and taxpayers will be interested in learning that a substantial amount still remains in the treasury to apply on the expenses of the coming year.

"More money will be needed from year to year. The budget for the coming year will be increased to $750,000, but because of the saving from last year's budget which resulted in a surplus, no increase in taxes for county school purposes will be necessary.

"This shows good business administration on the part of the superintendent and the county school board which should be appreciated by the taxpayers." Editorial—Duluth *News Tribune*, July 24, 1926.

3. The budget will be as good as the executive makes it.
4. The budget improves as administration improves.
5. The budget should not be discarded because of failure to use it advantageously.
6. Responsibility should not be placed in the budget.
7. The budget should not be followed blindly.
8. Judgment should be used. Remember the budget is based on estimate.
9. The budget should not be allowed to run the school and to kill initiative.
10. Remember the budget is to good administration what bookkeeping is to good accounting.

*This is the third article in a series of articles on school business administration by Professors N. L. Engelhardt and Fred Engelhardt. The fourth will be published in an early issue of* THE RECORD

# NEW STUDIES IN EDUCATION

## THE SMALL HIGH SCHOOL *

### STATEMENT OF THE PROBLEM OF THIS STUDY

THE median sized high school in the United States enrolls seventy-eight pupils. There are more than five thousand public secondary schools which enroll fifty or less pupils each. More than a half million American boys and girls get such secondary education as they receive in what may properly be called small high schools.

In spite of the importance of these small schools they have received comparatively little attention. A major part of the study that has been directed toward American secondary education has had the needs of the large high school in mind. In general, educators have either entirely neglected the small high school or have assumed that its problems are identical to those of the large school.

What are the problems of the school enrolling seventy-five or less pupils? Are they the same as those found in the high school enrolling ten, twenty, or thirty times as many pupils? Are there any problems which are peculiar to the small schools? If so, what are they? What are the principal obstacles to successful teaching in the small schools? How do their results of instruction compare with the results achieved in larger schools? What are the strong points to be found in the small school and what are the weaknesses? These and a multitude of other questions demand an answer. Unfortunately, these schools have received so little painstaking study that accurate information regarding them is exceedingly limited. With reference to their comparative efficiency there has been a wealth of opinion and a dearth of established facts. Some excellent studies have been made, but many more will be needed before opinions and assumptions can be replaced with accurate information.

It is the purpose of this particular study to add to the sum of knowledge regarding the small high school. There have been only a few studies in the field. Most of them have been extensive in character rather than intensive. While the value of the intensive study, utilizing the records and reports of many schools, is admitted, it is believed that these extensive studies must be supplemented by studies which are intensive in their character and which aim at getting many facts relative to a few high schools rather than a few facts about many.

### GENERAL PROCEDURE OF THE STUDY

Through the coöperation of the Pennsylvania State Department of Education, certain county superintendents and high

* By John Rufi. A Digest of Teachers College, Columbia University, Contributions to Education, No. 236.

school principals, arrangements were made for the detailed first-hand investigation of five high schools ranging in size from twelve to fifty-four pupils. In selecting the schools to be studied an effort was made to find schools that were generally conceded to be better than average.

The preliminary arrangements having been made the following steps were taken during the study:

1. A large number of objective measuring devices were applied within the schools themselves. These devices included fourteen tests or scales for the measuring of intelligence and achievement in the subjects taught. In all cases where objective scales, score cards or tests were available they were used in preference to the unsupported judgment of the observer.
2. Contacts were established with pupils, teachers, and principals. Classroom teaching was observed. Courses of study, textbooks and supplementary materials were noted. The library and laboratory facilities were inspected. Assemblies were visited and other extra-curricular activities were noted. It is believed that sufficient time was spent in each school to enable the writer to get a rather intimate knowledge of the general atmosphere and the spirit of both the pupils and the teachers.
3. Records and reports containing information relative to the schools or the community were used wherever they were available. These included materials within the county superintendent's office, the State Department of Education and the census bureau.
4. Although the chief emphasis of the study was put on the schools and their work rather than on their communities, it was felt that in order to know the schools well, to know their aims, ideals, strengths, weaknesses, and problems, it would be necessary to know considerable regarding the communities the schools were attempting to serve. For that reason the communities forming the environment of the schools were carefully observed throughout the course of the investigation.

Practically all of the material embodied in the study was secured in person by the writer who went to each community and remained there during the time required to gather the data.

### FAVORABLE FINDINGS OF THE STUDY

The study brings to light in the schools studied certain conditions which should be favorable to efficient work.

1. There is complete absence of either racial or foreign language problems.
2. The Boards of Education governing these schools are made up of men and women all of whom seem to be genuinely interested in promoting local education. The relations between board members and members of the teaching staffs seemed to be very cordial. There seemed to be mutual confidence and absence of friction.
3. The tenure of the teachers and principals in these schools is longer than it is in a majority of such schools as could be legitimately compared. All teachers and principals have been tendered renewal contracts for next year.
4. All of these schools have terms of

at least nine months. In this they are more fortunate than the average school of this size.

5. The academic training of these teachers and principals and the amount of teaching experience is slightly above the average for schools of similar size.
6. The average pupil-teacher load and the number of pupil recitations per teacher per week is small compared with most high schools.

The foregoing favorable points must be kept in mind when studying the problems found in these schools or in evaluating the results of the instruction given.

ADVERSE FINDINGS OF THE STUDY

1. None of these villages had made a serious effort to provide wholesome recreational life for its youth of high school age. There is a dearth of social life and a serious need for progressive community leadership which at present is not being met.
2. There is considerable variation in the ability of these communities to support education. The present system of state aid assists somewhat but does not compensate for these inequalities. The schools are not run as economically as they might be.
3. The physical plants and instructional equipment are far from adequate for purposes of secondary education.
4. The visits of the representatives of the State Department are largely inspectional in their nature and while the county superintendent's staff can give some assistance both groups are forced to distribute their efforts too widely to give as much assistance as is needed.
5. Judged by North Central Association standards all of these teachers and principals are overworked. There is no pretense of classroom supervision on the part of any of these principals.
6. The amount of professional reading and study by these teachers and principals during the school year is exceedingly limited.
7. Physical conditions do not favor studying on the part of pupils while at school and a large majority of those in attendance state that they do no school work at home.
8. The curriculum is limited, is predominately college preparatory, and emphasizes foreign languages. The subject matter offered is almost completely determined by the textbooks in use.
9. Most of the teaching is formal. Little or no supplementary material is used. The library and laboratory facilities are inadequate. A majority of the science courses are mere textbook courses.
10. The wide variation in the number of failures shows the lack of standards. The schools that fail the smallest percentage of their pupils are doing by far the poorest work.
11. The problem of the under-age and over-age pupil is very serious.
12. The results of the intelligence test clearly indicated that there is serious need for differentiation in teaching methods and in subject matter.
13. Tests designed to measure ability and achievement in reading, word recognition, spelling, composition, the use of mechanics of English, use of Latin forms, Latin translation, algebra, plane geometry, French, general science, chemistry, and biology

were given. Except in the case of the sciences all of the classes in all of the schools took their respective tests. Except in some very minor cases all of the classes in all of the schools are below standard. Out of a total of 135 grade groups or classes that were tested 7 groups either equalled or exceeded the standard while 128 groups were below standard.

14. Only one of these schools is offering a real program of extra-curricular activities.

APPLICATION OF FINDINGS

It must be clearly understood that these findings refer only to these five schools and not to small high schools in general. This being true the following are the most valuable results of this study:

1. The evidence indicates that these schools enjoy certain advantages not possessed by the average small high school. If under these favorable conditions the results of instruction fall so far short of the standard, the results being achieved in the average small high school may well be questioned. Certainly this study shows the serious need for additional investigations in this field.
2. The claim that the small high school is comparatively expensive is given additional support by the data gathered regarding these schools. The economic efficiency of the larger unit is further substantiated.
3. The need for curriculum studies with special reference to the problems of the high school is further emphasized.
4. The need for a program of extra-curricular activities which will meet the demands of small groups such as are found in high schools of from twenty to fifty pupils is shown. Plainly the extra-curricular activity programs of the large high schools are ill-adapted to these small schools.
5. The need for further studies relative to the preparation of teachers and principals for work in these schools is emphasized.
6. The lack of attention to the individual needs of pupils is shown. The difficulty of successfully taking care of individual differences in interests, aptitudes, and capacities among the pupils in these small groups is emphasized.
7. Practically all of the data show the need of additional study on the problem of the small high school.

## BUSINESS MANAGEMENT OF INSTITUTIONAL HOMES FOR CHILDREN *

THE PROBLEM

AN attempt is made in this study to indicate the means and methods desirable in transacting the business affairs of institutional homes for children and to formulate a system of financial accounting applicable to the situation. The problem of handling the business affairs of such institutions resolves itself into the application of generally accepted business procedures, and the problems of financial accounting involve

* By Leonard Bliss Job. A Digest of Teachers College, Columbia University, Contributions to Education, No. 215.

careful analysis of the types of service and activities in the institutions with provisions for proper accounting records.

### GENERAL PROCEDURE

The first attack upon the problem was the practical one of attempting through a survey to evaluate the efficiency of the administration of Hope Farm, a cottage home for children near Verbank, N. Y. As one of a group of four who made the survey the writer was confronted with the problem of determining the effectiveness of the business procedures found in the institution and the efficiency of the management as reflected by the costs of services rendered. A review of the literature in the field of institutional management and in the field of accounting failed to reveal any material of value applicable to the type of institution studied.

The writer then undertook to analyze the financial transactions of Hope Farm by a careful examination of all expenditures over a period of two years. These expenditures fell into certain groups, and with these groups as a basis the writer examined the records of a number of other institutions to find some scientific method of accounting for the financial transactions of institutional homes for children. No such method or system was found.

The investigation was broadened to include a larger number of institutions. Mooseheart, at Mooseheart, Ill., and The Marsh Foundation school at Van Wert, Ohio, and other institutions in and near New York City were visited. With observations made in these institutions and an analysis of the services rendered by institutions as a basis, a system of accounting was formulated to provide for recording the financial transactions of institutional homes for children. During the formulation of the system of accounts generous reference was made to accounting techniques developed in business enterprises.

The system of accounting thus formulated was installed in the Leake and Watts Orphan House, Yonkers, N. Y., for a thorough trial of its applicability to institutional homes for children and to reveal wherein it might be improved. In conjunction with the trial of the system of accounting, a business organization was set up and procedures indicated in this monograph were followed to determine if the application of business methods to the business affairs of an institution would not reduce costs and increase efficiency in the administration of its business affairs. The trial continued over a period of seven months.

### FINDINGS AND APPLICATION OF PROPOSED SYSTEM

The writer undertook to indicate an acceptable way of handling the business affairs of institutional homes for children by outlining some of the approved practices in the following business functions and indicating some forms that are useful in handling these functions:

1. Purchase of supplies.
2. Storage of supplies.
3. Distribution and accounting for supplies.
4. Operation of the physical plant and equipment of the institution.
5. Accounting for the property of the institution.
6. Managing the production enterprises of the institution: crops, gardens, and the dairy illustrate these enterprises.

7. Handling construction work done by the institution.
8. Financing and budgeting.

In the field of accounting an attempt was made to meet the needs of institutions by formulating a system of accounting specifically applicable to the financing of institutional homes for children. The treatment of the system includes:

1. A description of the books of account.
2. An outline of the accounts to be kept.
3. A description of the relation of the books of account and the accounts themselves.
4. A detailed analysis of each of the expense and capital accounts, and a comprehensive description of items included in the various accounts.
5. The preparation of:
   *a.* Institutional balance sheet.
   *b.* Income and expense statement.
   *c.* Cost statements.
6. The valuation of the assets of the institution.

Many of the procedures suggested have been validated by general use in business and manufacturing enterprises and some have been extensively used in conducting the business phases of the public schools. No new books of account have been evolved.

The application of bookkeeping technique to the institutional field has been accomplished in this study. The analysis of the services and activities of institutional homes for children forms the basis for the functional distribution of expenditures which is developed in this monograph. The major functions are:

Administration
Child Care
Instruction
Operation
Capital Expense
Institutional Production

The Child Care function is subdivided into services: (1) Food, (2) Clothing, (3) Laundry, (4) Household, (5) Health and Other Services.

The application of the business procedures proposed in this monograph will make more probable—if it does not insure—proper business methods and practices. The use of the accounting system proposed—

1. Provides financial data necessary for intelligent management.
2. Provides cost data upon the basis of kinds of service rendered.
3. Makes possible the comparison of costs in similar institutions.
4. Makes possible the evaluation of the production activities of the institution.
5. Makes possible the installation of scientific budgetary practice.

# COLLEGE NEWS

## TRUSTEES

### RESIGNATION OF DEAN RUSSELL

October 11, 1926

To V. Everit Macy, Esq.,
*President of the Board of Trustees*

My Dear Mr. Macy:

At the end of the present academic year I shall have completed thirty years of service to Teachers College. These years have given me abundant cause for thankfulness to all my associates—to the Trustees for their unswerving support in every project that I have presented to them, to the College staff for their generous good will and unanimous coöperation in every undertaking, and to the many thousands of students whose loyalty to the institution is unparalleled in any other professional school.

The College has passed successfully through the perils of infancy and adolescence. It has arrived at a mature stage which, so far as I can see, will continue for an indefinite period. The problems that confront us are different in many respects from those which have been met in the past. But they are no less difficult of solution. Indeed, they are likely to be even more perplexing. The novelty of Teachers College has worn off. Even our name has been appropriated by more than a hundred institutions to which we are sending better equipped instructors than we ourselves could command a few years ago. Backed by state support, some of these schools are in a most enviable position. If we are to retain a leading place among them, it will be by constantly increasing our efficiency. This means in turn a very considerable increase in our financial resources.

The problems of internal administration are quite as difficult of solution as are those pertaining to business management. Our student body is composed of mature students whose purpose is to fit themselves for the strategic positions in the educational world. Their need is for guidance not merely in the tasks which will command their attention immediately on leaving us, but in the situations which will confront them ten years afterward. Our task, therefore, is to give them not only greater technical skill, but also the will and the way to continued professional growth. This end calls for both an understanding of the present and a vision of the future. It means for our staff an incessant struggle to meet the changing conditions in the educational field.

An institution, like all things alive, must either go forward or go back; it cannot stand still. Stagnation is death. The greatest danger to Teachers College is that it may be content to rest on its accomplishments. A few years of complacent living might be an agreeable change from the growing pains of youth. But I

have no desire to participate in such serenity. I love the College too well to be an incubus when I have passed my prime.

It is with profound gratitude for the opportunities which I have enjoyed, therefore, that I present herewith my resignation as Dean of Teachers College to take effect at your option, but not later than June 30, 1927. I should like to retain my professorship a few years longer, not that I think I can rival my associates in class instruction, but in order to give such service as may be desired in acquainting my successor with the inner workings of the institution and assisting whenever called upon in making the adjustments which are inevitable under a new régime. My only regret is that I shall miss the close association that I have had for a working lifetime with the noble men and women on our Board of Trustees. But I shall not lose the memory of all that they have done for me.

With sincere affection, I remain

Faithfully yours,

JAMES E. RUSSELL

## ACTION OF THE TRUSTEES

AT the call of the Chairman, a meeting of the Executive Committee was held on October 19, 1926. After consideration of Dean Russell's letter of October 11, a special committee was appointed with instructions to report to the Trustees. At a special meeting of the Board of Trustees held on November 4, the following report was presented and accepted and the resolutions were adopted as recommended.

TO THE TRUSTEES OF TEACHERS COLLEGE:

The special committee appointed by the Chairman of the Trustees to consider the letter addressed to the Chairman by the Dean of the College under date of October 11, 1926, tendering his resignation as Dean, to take effect not later than June 30, 1927, have the honor to submit the following report:

The Dean has made it plain in his long and intimate conferences with the President and with individual Trustees that the step he has taken is the result of careful deliberation and represents what he believes to be best for the interest of the College. The committee are convinced that it would be as unbecoming as useless to attempt to alter the Dean's determination which is the result of long and earnest consideration on his part. Deeply regretting, as every friend and lover of the College must, that the Dean feels the time to have come when he should lay aside the burden of administrative service which he has carried so long and so brilliantly, the committee believe it would not be an act of kindness or of friendship to distress him by farther insistent urging that he alter his fixed determination to retire. The Trustees, Faculties and the Alumni of the College, as well as those of the University at large, have shown constantly and in many ways their appreciation of the Dean's service and their personal affection for him, and they will always continue to do so.

The Dean's letter opens the way to a course of action which will retain for the College, it is hoped for many years to come, his personal association and his counsel, while at the same time relieving him of the administrative duties of the deanship.

The committee recommend the adoption of the following resolutions:

*Resolved,* That the resignation of James Earl Russell, Ph.D., LL.D., as Dean of Teachers College, tendered in a letter addressed by him to the Chairman of the Trustees under date of October 11, 1926, be accepted at his own urgent request, to take effect on June 30, 1927, with every possible expression of regret for his withdrawal from chief administrative responsibility, of admiration for his long and distinguished service to the College and to the cause of education, as well as of affection for his person;

*Resolved,* That upon his retirement from the deanship Dean Russell be invited to remain in the service of the College as Barnard Professor of Education with the farther title of Dean Emeritus. . . to render such service in directing instruction and research and in giving counsel to the officers of the College as he may find desirable and opportune.

In the judgment of the committee, it is imperative, in the interest of Teachers College and its work, that there be no delay in selecting and announcing a successor to Dean Russell. . . . The Statutes of the University and of the College require that the dean shall be appointed by the Trustees of Teachers College on the nomination of the President of the University. The President, having taken counsel of Dean Russell himself, of the members of the present committee, and of the spokesman for the College faculties, Professor David Eugene Smith, and having himself studied with earnest care the field of available personalities, has advised the committee of his readiness to nominate to the Trustees at their meeting on November 4, William Fletcher Russell, Ph.D., now Professor of Education and Associate Director of the International Institute of Teachers College, to be Dean of Teachers College from July 1, 1927, during the farther pleasure of the Trustees. . . . It is a mere accident, if a happy coincidence, that the man chosen by the President and warmly endorsed by the members of this committee is a son of the present Dean. He has been chosen not because of that fact, but in spite of it. In age, in scholarship, in broad human sympathy, in rich and helpful personality and by reason of an experience quite unusual for a man of his years, Professor William F. Russell stands out as pre-eminently the man best fitted to succeed to the administrative post soon to become vacant by his father's retirement.

When the President shall submit the nomination of Professor Russell, the committee recommend the adoption of the following resolution:

*Resolved,* That, pursuant to the provisions of the Statutes of Teachers College, Chapter II, Section 10, and upon the nomination of the President of the University, William Fletcher Russell, Ph.D., formerly Dean of the College of Education of the State University of Iowa, now Professor of Education and Associate Director of the International Institute of Teachers College, be and hereby is appointed to be Dean of Teachers College from July 1, 1927, during the farther pleasure of the Trustees. . . .

Respectfully submitted
FRANK R. CHAMBERS, *Chairman*
DUNLEVY MILBANK
CLEVELAND E. DODGE
FELIX M. WARBURG
NICHOLAS MURRAY BUTLER
ARTHUR TURNBULL

October 30, 1926

## AN EDITORIAL FROM THE *NEW YORK TIMES*, SATURDAY, NOVEMBER 6, 1926

### TRAINING TEACHERS

While Dr. James E. Russell has asked to be relieved of the purely administrative duties of the Deanship of Teachers College, it is gratifying to learn that he is to devote his entire time hereafter to the purely professional task of developing greater efficiency in teaching. He has ceased to be Dean of an institution in order to be a teacher of teachers. The tendency of the specialist in any field, as he said in his annual report for the last academic year, is 'to magnify the subject, perfect its organization, systematize its content and extend its range.' Administration or specialization, whatever it is, tends to become an end in itself. The effort of the institution for the training of teachers must therefore be to prevent those who specialize in administration from making a fetish of organization, to see to it that principals and supervisors are not mere business managers, and to put experts in research where they belong, 'as servants in the house rather than as masters of the domain.' The aim must be in every specialization to approach the perfect practitioner who is the ideal classroom teacher.

Even the best of training with the best of material can result only in the nearest assignable approach to the need, yet never quite meeting it. Few come within even that distance, partly because the teacher has no period of apprentice training comparable to that in the professions of law, medicine and engineering. As a rule the young teacher must stand alone from the first day of his service, working as he does behind closed doors. 'In the pedagogical millennium every school and school system will accept one novice for every ten teachers in service.' Under such a plan, Dean Russell sees schools in which all teachers are as good as the best are now. It is with such a vision before his own eyes that he leaves a Deanship to enter the classroom.

It is not a retirement for Dr. Russell, but an advancement to a more intimate leadership in a service to which he has given his life. He has brought Teachers College into a foremost place. He now gives the highest testimony to the importance of the part which the teachers under him have had in that development, by taking his place with them in training those of whom it has been said in a Carnegie Foundation report that, if training of any sort can provide men and women who are equipped and willing to serve youth as youth should be served, their service is pre-eminent. But rising in importance even above that is the service of those who give this training. Dr. Russell, in his resignation of an administrative position in order to take on the less conspicuous duties of a teacher, has lifted his profession in this very act.

---

## COLLEGE NOTES

### EDUCATIONAL ADMINISTRATION

Professors George D. Strayer and N. L. Engelhardt addressed, on Monday, October 25, a public meeting of the citizens of Fort Lee, N. J., called for the purpose of informing the citizens concerning the character of the work

done by a school survey and the kinds of results that have developed out of other school surveys.

A score card and standards for janitorial engineering service in school buildings have been prepared by Dr. Engelhardt, Professor Reeves of Elmira College, and Business Superintendent G F. Womrath of the Minneapolis Public Schools. These publications have been issued from the press of the Bureau of Publications of Teachers College.

Professors Strayer and Engelhardt have sent to the press of the Bureau of Publications their second problem book. This book is called *School Building Problems* and will be ready for distribution for the second term of the present school year. The book will contain 110 problems distributed under the following sections: 1. Population Studies; 2. Number and Location of School Buildings; 3. Utilization of School Buildings; 4. School Building Programs; 5. Selection of the Architect; 6. Architect's Plans and Specifications; 7. School Building Contracts; 8. Construction of School Buildings; 9. School Buildings in Rural Communities and Villages; 10. Planning New Elementary Schools; 11. Planning New High Schools; 12. Service Facilities; 13. Rooms Requiring Special Planning; 14. Equipment Planning; 15. Financing School Building Programs; 16. Cost of School Buildings; 17. Fire Costs and Fire Insurance; 18. Publicity and Graphic Representation. There will also be found in this book the most extensive bibliography on school buildings which has yet been published.

Professor Engelhardt is giving a series of lectures before the Principals' Club of Newark, N. J., on "The Efficient Principal." To these meetings Newark principals have invited many principals from adjoining communities.

A volume by Dr. A. K. Loomis, Director of Curriculum Research of the Denver Public Schools, on the *Cost of School Equipment and Methods of Estimating Them,* has just come from the press of the Bureau of Publications, Teachers College. This is Volume No. 2 of the Strayer-Engelhardt School Administration Series.

Dr. Strayer addressed the Eastern Kentucky State Teachers Association at Ashland, Kentucky, on October 28 and 29.

A *Record Book for High School Principals,* prepared by Professors Strayer and Engelhardt, has been issued from the press of C. F. Williams & Son, Albany, N. Y. This *Record Book* will assist principals in making accumulative surveys of their schools and will also be of value as a permanent continuing record of the achievements and progress in any single school. The editors, in the preparation of this volume, have also borne in mind its use as a field survey book when surveys are undertaken of city school systems.

Professor Engelhardt addressed the principals of the city of Baltimore at two meetings on Friday, October 29.

The report on the survey at Nyack, N. Y., made by the students of the Second Major Course for Superintendents of Schools under the direction of members of the staff, was presented to the public in Nyack at public meetings held during the week of November 22.

Professor Strayer spoke before the Colorado State Teachers Association at meetings in Pueblo and Denver on November 11, 12, and 13.

On November 10 Professor Paul Mort addressed the Teachers' Welfare

League of New York City on "The Relation of the State to the Locality in the Financing of Education."

## ADVISERS OF WOMEN

Professor Sarah M. Sturtevant spent several days in Kentucky early in November, addressing the State Association of Deans of Women on November 7, at their annual meeting in Winchester, and speaking before the students of the Eastern Kentucky Normal School and Teachers' College at Richmond. Professor Sturtevant also visited the University of Kentucky, at Lexington, as the guest of Miss Sarah Blanding, Dean of Women.

The Advisers' Club held its first social meeting for the year on Tuesday evening, October 21, when the members met for dinner at International House. The club was especially fortunate in having Dr. Paul Monroe as the speaker for the evening. He gave a most interesting account of some of his recent educational studies in other countries, stressing the remarkable and significant strides toward a new freedom on the part of women in the Orient and in Eastern Europe. The latter part of the evening was spent in viewing the various interesting features of International House. In addition to Dr. and Mrs. Monroe, the special guests of the club on this occasion were Mrs. Marion Leroy Burton and Miss Lucetta Daniell.

The National Association of Deans of Women has recently established a permanent office in Washington, at 1634 Eye Street (the national headquarters of the American Association of University Women). Miss Gladys W. Jones is in charge as executive secretary.

Miss Edith Tallmadge (T. C. '24) is now industrial secretary at the Y. W. C. A. in Albany, N. Y.

Miss Lillian Espey has accepted a position as social director at Houston House, a social settlement in New York City.

## ECONOMIC SCIENCE

Mr. Shelby M. Harrison, associate director of the Russell Sage Foundation, will give a course in Teachers College during the Spring Session on Housing and Family Welfare.

Professor Ernest R. Groves, lecturer in Social and Economic Science in the Summer Sessions of 1925-26, will bring out shortly a college textbook on *The Family*. It will appear in the Lippincott Home Manual and Family Life Series under the editorship of Professor Benjamin R. Andrews. There is a rapidly growing interest in the colleges in courses which consider problems of personal and social adjustment related to the family, and Professor Groves is recognized as the leading student in this type of problem.

## EDUCATIONAL SOCIOLOGY AND VOCATIONAL EDUCATION

On October 6 about one hundred and fifty students of Teachers College attended an organization meeting of the Educational Sociology Club. Short addresses were made by Professors David Snedden and Daniel H. Kulp, and by Miss Louise Metcalfe and Miss M. D. Power, of the department of Nursing Education. Officers for the year were elected, as follows: President, Wayland J. Hayes; vice-president, A. O. Bowden; secretary, Amelia Bengston; treasurer, E. E. Selle; publicity secretary, Mary S. Power; social secretary, Hally Flack; faculty advisers, Miss Louise Metcalfe and Dr. Kulp. The membership during

the first two weeks has almost doubled the grand total of last year.

On October 16 the club introduced its season's program by making a tour of Manhattan Island, at which time the regional characteristics of this part of New York City were discussed and observed.

On October 8, Professor Kulp delivered a lecture at the first educational meeting of the Women Teachers' Professional and Social Club of Allentown, Pa. He spoke on "Educational Sociology" as illustrated by attempts to discover the educational functions of non-school experiences.

On October 21 Professor Snedden attended the New York State Teachers' Convention at Utica, where he delivered an address on the topic: "Clearing Up Objectives of Industrial Arts at Several School Levels."

Professor Snedden gave an address at the dedication exercises of the Rhame Avenue School, East Rockaway, which were held on October 23.

## ELEMENTARY EDUCATION

Professor J. R. McGaughy gave addresses before the three New Jersey County Teachers' Institutes, meeting in Audubon, Morristown, and New Brunswick during the month of October.

On Thursday and Friday, November 4 and 5, Professor McGaughy gave addresses before different sections of the Central Western District of the New York State Teachers' Association, meeting at Rochester. On Thursday evening, November 4, he was the dinner guest of the elementary principals of Rochester.

The final report of the Citizens' Committee on Teachers' Salaries in New York City is expected to be in the hands of the printer by the middle of December. It will be a volume of approximately one hundred and fifty pages, recording the Committee's plans of procedure and definite salary schedules recommended for New York City teachers. In the Appendix will be found detailed statistical tables based on facts concerning more than 11,000 teachers. Professor McGaughy has been director of this study and is writing the final report.

On December 5, at Lancaster, Pa., Professor Edwin H. Reeder gave three lectures to the County Institute on the general topic, "Teaching Children How to Study."

## INDUSTRIAL ARTS EDUCATION

On November 3, Professor F. G. Bonser worked with the supervisors and teachers of Woodlawn, Pa., on the revision of their curriculum. November 4 and 5 he spent at the State Teachers' Association meeting at Milwaukee, Wis., where he spoke before the fine arts section, the home economics section, the industrial arts section, and the vocational school section. He spoke also on the elementary school curriculum before the Classroom Teachers' Association, which held a dinner session on the evening of November 5. Professor Bonser returned by way of Cadillac, Mich., where his daughter, Virginia, is teaching in the County Normal School.

The Industrial Arts Coöperative Service has moved its office to 519 West 121st Street. Starting two years ago as a mutually helpful organization among a few students and alumni, this Service has grown until the demands made upon it require almost the full-time attention of one person. There seems to be a very real need for this coöperative enterprise, and many teachers are finding it a source of great helpfulness.

Miss Alice M. Krackowizer is teaching industrial arts and geography in the new State Normal School at Salisbury, Maryland. Here an effort is being made to adapt the work to the needs of country schools and other small schools where time and materials have to be used with the greatest economy.

## KINDERGARTEN-FIRST GRADE

Miss Grace A. Langdon is in charge of nursery school theory and practice, while Miss E. Mae Raymond is on leave of absence.

Miss Margaret Allen is supervising the kindergarten practice students.

An extension course is being given at Yonkers by Miss Charlotte Garrison, Miss Alice J. Thorn and Miss Edith Conard.

Miss Agnes Burke spoke at the Central New York State Kindergarten Convention at Utica and at the Wisconsin Kindergarten Convention at Milwaukee.

Miss Alice Dalgliesh spoke at the Connecticut Valley and Massachusetts Kindergarten Convention in Springfield.

Miss Conard spent four days in Cleveland presenting manuscript writing to the teachers of the school system of Shaker Heights, and demonstrating it to the children in the schools. Manuscript writing has been adopted by a number of private schools in this country, including Horace Mann School.

A series of radio talks to mothers is being broadcast by WEAF on Mondays at 11:15 A.M. All members of the Kindergarten-First Grade staff are participating in this series.

The Kindergarten-First Grade Club has been organized for the year with the following officers: President, Miss Anne S. Blake; vice-president, Miss Winifred Bain; treasurer, Miss Lilian Schmehl; secretary, Miss Mabel L. Walker.

Professor Patty S. Hill spoke in November in Des Moines, Iowa City, Kansas City (Missouri), Kansas City (Kansas), and Baltimore. In October she addressed the Northeastern Wisconsin Teachers' Union and the North Central Indiana Teachers' Association.

## LINCOLN SCHOOL

Dr. Otis W. Caldwell addressed the Sectional Teachers' Conference in Uniontown, Pa., on October 12, on the subject, "Some Illustrations of Experimental Curriculum Work." On the evening of that day he spoke to the teachers and citizens of Uniontown on "What Are the Purposes of Modern Education?"

On October 14, he spoke before the Southeastern Section of the New York State Teachers' Association on "The Development of General Science Courses." On October 21, he gave an address, "The Science Courses in Secondary Schools," to the Science Section of the Central Association of New York, at Utica. On the following day he spoke before the Connecticut State Teachers' Association at New Haven, on the topic, "The Development of General Science Courses."

Dr. John R. Clark gave an address on "Investigations in Teaching Demonstrative Geometry," before the New York State Teachers' Association at Albany, October 21. He spoke before the meetings of the Connecticut State Teachers' Association at New Haven and at Bridgeport on "The First Month in Plane Geometry."

Mr. J. G. Kuderna gave an address before the Science Section of the Connecticut State Teachers' Association at Bridgeport, on October 22; his topic

was "Correlation of Sciences in the High School."

The Lincoln School staff was fortunate in having Dean Russell and Dr. Abraham Flexner, Secretary of the General Education Board, speak at two of their recent meetings.

Part One of the *Twenty-Sixth Yearbook of the National Society for the Study of Education* has just been published. *The Yearbook* is a symposium on "The Foundations and Technique of Curriculum Making," Part One being concerned with "Curriculum-Making, Past and Present." In several respects this is among the most ambitious undertakings of the Society. A special effort has been made to bring together and so far as possible unify and reconcile the varying and often seemingly opposing philosophies of the curriculum held by the leading authorities or by their adherents in this country. The book attempts to discover not what the curriculum should be, but how the content of the curriculum should be selected and assembled. Dr. H. O. Rugg was chairman of the committee in charge of the compilation of *The Yearbook*.

## MUSIC EDUCATION

During the summer Professor Charles H. Farnsworth underwent a serious operation. He is now recuperating rapidly and there is every prospect that he will soon be in better health than he has been for years. He has gone to Washington, D. C., where he will spend the winter doing editorial and research work at the Congressional Library.

A weekly convocation of the Music Education students is held on Wednesday noons. In addition to singing and announcements there is a short address. During the first month the speakers were Professor Dykema, Dr. Whitley, Mr. C. M. Trèmaine of the National Bureau for the Advancement of Music, and Miss Katherine Hargrave, who is a student at Teachers College this year after teaching for five years in India.

Remarkable developments have been made in the instrumental work of the department. In addition to Mr. Norval L. Church, who is in charge of this work, Mr. Jesse L. Scott and Mr. Irving Cheyette give instruction at Teachers College; and Mr. William S. Larson, Mr. E. H. F. Weis, and Mr. Walter Rennie, in consultation with the department, conduct instrumental activities in both Horace Mann Schools, the Lincoln School, and the Institute of Musical Art. At Teachers College the students and general faculty make up four orchestras—three elementary and one advanced.

During November several members of the Music Education staff conducted conferences and delivered addresses in Cleveland, Ohio, Roanoke, Virginia, Atlantic City, New Jersey, Elizabeth, New Jersey, and at other state association meetings.

## NUTRITION

The third edition of Professor Henry C. Sherman's textbook, *Chemistry of Food and Nutrition,* was published in June, which made it available for use in the Summer Session.

At the International Institute of Politics held at Williamstown, Mass., during August, Professor Sherman was one of the speakers in a series of lectures on the general topic, "The Rôle of Chemistry in World Affairs," taking as his subject, "Nutrition and Health." In addition to lecturing he conducted a

sectional round table and took part in a general round table.

At the Fiftieth Anniversary Meeting of the American Chemical Society in Philadelphia during the week of September 6, Professor Sherman with Professor La Mer and Dr. Kenney presented a paper on Vitamin C.

During the week of September 13 the annual Congress of the International Union of Pure and Applied Chemistry met in Washington, D. C. At this Congress Professor Sherman served on the Committee on Biochemical Nomenclature.

At a session of the Children's Hospital Association of America in Atlantic City on September 13 Professor Rose presented a paper entitled "What Has Metabolic Research Taught Us in Regard to the Nutrition of Children?" On November 1, by request, she repeated this lecture for the New York Dietitians Association at their monthly meeting.

At the Buffalo, New York, meeting of the American Public Health Association Professor Sherman, as chairman of the Committee on Nutritional Problems, reported on October 12 on "The Relation of Dairy Products to Health through Nutrition."

At a meeting of the Philadelphia Section of the American Chemical Society, on October 21 Professor Sherman spoke on "Some Recent Advances in the Chemistry of Nutrition."

Miss Margaret C. Hessler, after spending the college year of 1925-1926 as research assistant in food chemistry in the department of chemistry at Columbia University, has returned to her former position on this staff as instructor in nutrition. Miss Hazel K. Stiebleing, who acted as instructor in Miss Hessler's absence, is in the department of chemistry at Columbia this college year as research assistant in food chemistry.

Mrs. Gertrude York Christy, who was assistant in this department last year, has returned to her position as head of the Department of Home Economics at the University of Southern California, from which she was on leave of absence for the year here.

Miss Clara Mae Taylor, formerly of the staff of the Department of Home Economics at Rhode Island State College, has taken the position of assistant in this department for the current college year.

## PHILOSOPHY OF EDUCATION

Professor William H. Kilpatrick's friends will be interested in the following notes from his letter, written from Vienna, October 10, 1926.

Dr. Dengler has been most hospitable. He "is taking excellent care of us here with his Austro-American Institute. I have met a number of professors and other interesting people here. At Dr. Dengler's request I agreed to deliver a lecture at the University. He made it the occasion for introducing the Institute and so brought together a large number of rather prominent people." An enclosed clipping from the *Neues Wiener Tagblatt* of October 10 notes that those present at this meeting included, aside from leading educators, the President of the Austrian Republic and the British, Hungarian, and Polish Ministers.

Professor Kilpatrick has, of course, been most interested in the developments of education in Austria. "I have visited a good many schools here. There has been a real revolution in the elementary

schools of the city. . . . Dr. Dengler's work is distinctly good. . . . I was particularly interested in Dr. Buhler's work in psychology. . . . I believe she can safeguard her conclusion in a way, successfully to defend her method. . . . Her study of child psychology and child development must be studied by our nursery school people."

The President of the Republic, at Dr. Dengler's request, "placed at my disposal the presidential box in the national opera house here. As this was formerly the Emperor's box it gave rise to many thoughts in connection."

"Mrs. Kilpatrick was not so well for awhile and we stopped here to let her recover her strength. She seems now well again and we are going on our way Wednesday, the 13th, for Constantinople."

Since Professor Kilpatrick left for his world tour the Macmillan Company has published his new book, *Education for a Changing Civilization.*

## SECONDARY EDUCATION

During the fall Professor Thomas H. Briggs has spoken at the State Teachers Associations of North Carolina, Connecticut, Delaware, and Kansas; and before the Administrators Section of the Detroit Teachers Association.

In October Professor Briggs spent two days in Ridgewood, N. J., studying the schools and advising the board of education as to plans of reorganization and building.

Professor Franklin W. Johnson addressed the teachers of Springfield, Ohio, on October 28, and on October 29 and 30 delivered several addresses before the Southeastern Ohio Teachers Association.

Dr. Percival M. Symonds' class in measurement is doing testing with the Terman Group Test and the Thorndike C A V D test in the following schools: Friends School, Brooklyn; Brooklyn Polytechnic Preparatory Country Day School; Adelphi Academy; Scarborough School; South Orange High School. The testing is being done on high-scoring pupils in order to study equality of units in the upper levels of the Terman scale.

An article by Dr. Symonds on "Variations of the Product-Moment (Pearson) Coefficient of Correlation" was published in the October number of the *Journal of Educational Psychology.*

Professor Maxie N. Woodring is giving an extension course in Junior High School Teaching to a group of junior high school teachers of New Rochelle, N. Y.

On Saturday, October 9, the members of the Secondary Club attended a get-acquainted picnic at the Horace Mann School for Boys. A hilarious afternoon of games was followed by camp-fire suppers on the hill nearby. Various members of the faculty made brief after-supper speeches. At the second meeting of the club on October 18, the following officers were elected: President, Mark Godman; vice-president, Jessie Williams; treasurer, J. T. Miller; secretary, Liberty McCelland.

# ALUMNI ACTIVITIES

## THE TEACHERS COLLEGE ALUMNI ASSOCIATION OFFICERS

*President:* Mr. Zenos Scott, Superintendent of Schools, Springfield, Mass.
*First Vice-President:* Dr. Fannie W. Dunn, Assistant Professor of Education, Teachers College.
*Second Vice-President:* Dr. Bessie Lee Gambrill, Professor of Education, Yale University, New Haven, Conn.
*Recording Secretary:* Miss Mary Lewis, Teacher in Horace Mann School, Teachers College, New York City.
*Corresponding Secretary:* Mrs. Edith Swan Morey, Camp Hill, Pa.
*Treasurer:* Dr. R. G. Reynolds, Director, Bureau of Educational Service, Teachers College.
*Members-at-Large:* Mr. Frank Pickell, Superintendent of Schools, Montclair, N. J.
Miss Annie Grace, 300 Park Avenue, Baltimore, Md.
Miss Marion Sheridan, 711 Orange Street, New Haven, Conn.
*Alumni Trustees:* Mr. Jesse Homer Newlon, Superintendent of Schools, Denver, Colo.
Miss Mercy J. Hayes, 301 American State Bank Building, Detroit, Mich.
*Alumni Office:* Russell Hall, Teachers College, 525 West 120th Street, New York City.

Address all communications to Rollo G. Reynolds,
Field Secretary, Teachers College, New York City.

## SECRETARY-TREASURERS OF TEACHERS COLLEGE CLUBS

Africa—South Africa Club
Dr. E. G. Malherbe
University of Cape Town
Cape Town, South Africa

Alabama—State Club
Miss Agnes Harris
Auburn, Ala.

Arkansas—State Club
Mr. H. G. Hotz
University of Arkansas
Fayetteville, Ark.

California—Southern Club
Miss Ethel I. Salisbury
744 New Hampshire Avenue
Los Angeles, Calif.

CHINA—EAST CHINA
Mrs. Nita M. Stallings
Soochow, Ku, China

CONNECTICUT—NEW HAVEN CLUB
Miss Frances Terrill
100 Whalley Avenue
New Haven, Conn.

CONNECTICUT—STATE CLUB
Mrs. A. W. Jennings
1172 Chapel Street
New Haven, Conn.

GEORGIA—MACON CLUB
Miss Mamie W. Jones
117 Corbin Avenue
Macon, Ga.

GEORGIA—STATE CLUB
Miss Leila Bunce
Director, Home Economics
Fulton High School
Atlanta, Ga.

INDIANA—SOUTH BEND CLUB
Miss Mamie E. Kerner
115 North William Street
South Bend, Ind.

INDIANA—STATE CLUB
Mr. Howard R. Evans
Principal of Schools
Fontanet, Ind.

MAINE—STATE CLUB
Miss Mary Louise Hastings
Director of Training
State Normal School
Gorham, Me.

MARYLAND—STATE CLUB
Miss Lucetta M. Sisk
Principal, High School
Randallstown, Md.

MICHIGAN—ANN ARBOR CLUB
Secretary
Miss Ethyl M. Neelands
Couzens Hall
Ann Arbor, Mich.

Treasurer
Miss Edith Bader
548 Thompson Street
Ann Arbor, Mich.

MICHIGAN—BATTLE CREEK CLUB
Mrs. D. R. Dudley
Assist. Superintendent of Schools
Battle Creek, Mich.

MICHIGAN—DETROIT CLUB
Secretary
Miss Zaide L. Voorheis
Northern High School
Detroit, Mich.

Treasurer
Mr. Robert Magee
Registrar, Detroit Teachers College
Detroit, Mich.

MICHIGAN—GRAND RAPIDS CLUB
Miss Mabel Hutchings
Kensington School
Kensington and Curve Sts.
Grand Rapids, Mich.

MICHIGAN — NORTHERN MICHIGAN CLUB
Mr. Sidney Herring
401 Front Street
Marquette, Mich.

MINNESOTA—STATE CLUB
Miss Jean Alexander
College of Education
University of Minnesota
Minneapolis, Minn.

MISSOURI—KANSAS CITY CLUB
Miss Jessie McKay
3517 Charlotte Street
Kansas City, Mo.

MISSOURI—ST. LOUIS CLUB
Miss Edena Schaumberg
5112 Maple Avenue
St. Louis, Mo.

MISSOURI—STATE CLUB
Miss Madeleine Farley
Bancroft School
Kansas City, Mo.

NEW YORK—BUFFALO CLUB
Miss Agnes McCarthy

Technical High School
Buffalo, N. Y.

NORTH CAROLINA—RALEIGH CLUB
Miss Ellen D. Brewer
Meredith College
Raleigh, N. C.

NORTH CAROLINA—STATE CLUB
Mr. L. R. Johnson
111 Steele Street
High Point, N. C.

OHIO—AKRON CLUB
Miss Clara Barker
614 West Market Street
Akron, O.

OHIO—ATHENS CLUB
Mrs. E. B. Smith
University of Ohio
Athens, O.

OHIO—CINCINNATI CLUB
Mr. E. D. Roberts
Asst. Superintendent of Schools
Denton Building
Cincinnati, O.

OHIO—CLEVELAND CLUB
Secretary
Miss Bernice McPhinney
Board of Education
Cleveland, O.
Treasurer
Mr. Harry A. Bathrick
Prin., East Technical High School
Cleveland, O.

OHIO—KENT CLUB
Miss Isabelle Hazen
Franklin Apartments
Kent, O.

OHIO—TOLEDO CLUB
Miss Grace Gordon
Riverside School
Toledo, O.

OKLAHOMA—STATE CLUB
Miss Frances J. Evans
University of Oklahoma
Norman, Okla.

PENNSYLVANIA—ERIE CLUB
Miss Elizabeth Pfeiffer
615 East Tenth Street
Erie, Pa.

PENNSYLVANIA—HARRISBURG CLUB
Miss Helen Krall
221 S. 13th Street
Harrisburg, Pa.

PENNSYLVANIA—PHILADELPHIA CLUB
Miss Alice M. Baker
State Normal School
West Chester, Pa.

PHILIPPINE ISLANDS
Mr. Sabino Taburnor
Bureau of Education
Division of Bataugas, P. I.

VERMONT—STATE CLUB
Miss Mary B. Sullivan
Normal School
Castleton, Vt.

VIRGINIA—STATE CLUB
Mr. C. B. Givens
4010 West Street
Richmond, Va.

WEST VIRGINIA—STATE CLUB
Miss Wilma C. Spears
Marshall College
Huntington, W. Va.

WISCONSIN—STATE CLUB
Mr. H. W. Peterson
1049 39th Street
Milwaukee, Wis.

---

## PRESIDENTS OF CLASSES

CLASS OF 1916
Miss Mildred Memory
1 Kermit Road
Maplewood, N. J.

CLASS OF 1917
Mrs. Hazen Hoyt
3558 65th Street
Woodside, L. I.

CLASS OF 1918
Mrs. Louise Holbrook Baldwin
1669 Columbia Road
Washington, D. C.

CLASS OF 1919
Mrs. Joseph M. Couse
408 Asbury Park Avenue
Asbury Park, N. J.

CLASS OF 1920
Miss Ruth Taft
294 Macon Street
Brooklyn, N. Y.

CLASS OF 1921
Miss Margaret Briggs
1505 Jefferson Avenue
Scranton, Pa.

CLASS OF 1922
Miss Eva Wagner
Lincoln School
425 West 123rd Street
New York City

CLASS OF 1923
Miss Grace Ely
6 Kendall Green
Washington, D. C.

CLASS OF 1924
Miss Sallie Serson
34th and Chestnut Streets
Philadelphia, Pa.

CLASS OF 1925
Miss Helen Warren
The Garrison Forest School
Green Spring Valley
Garrison, Md.

CLASS OF 1926
Miss Yvonne Fassler
Winthrop College
Rock Hill, N. C.

## INDIANA STATE CLUB

The annual meeting of the Alumni Association of Teachers College and Columbia University was held on Friday evening, October 22, at the Spink Arms Hotel, Indianapolis. Forty members of the club were present. The association was glad to have with them Professor Mabel Carney, who gave an interesting and entertaining report on the work and progress of Teachers College, with special emphasis on the work that is being done in Africa.

The following resolution was unanimously passed and sent to Dean Russell:

*Resolved* that the Alumni Association of Teachers College sends hearty greetings to Dean Russell, that we are gratified at the fine work that is being done at Teachers College under his direction, and that we are pleased to know that Teachers College is rapidly taking its place in training teachers and educational leaders for the entire world, and that we pledge Dean Russell our loyal support and best wishes in all his work.

An expression of hope for the speedy recovery of Mrs. Russell from the effects of her recent injuries was also expressed.

The officers elected for the ensuing year are as follows: President, Miss Flora E. Drake, assistant superintendent of schools, Indianapolis, Ind.; vice-president, Mr. J. W. Stott, superintendent of schools, Frankfort, Ind.; secretary-treasurer, Mr . Howard R. Evans, principal of schools, Fontanet, Ind.

## ALUMNI NOTES

Lucy Helen Meacham (A.M. 1920), who has been director of grades in Okmulgee, Okla., was elected in August to the position of director of grades,

Oklahoma City, Okla. For the past three summers Miss Meacham has taught in the educational department of the Agricultural and Mechanical Arts College, Stillwater, Okla.

Charles Henry (A.M. 1926) in September became a member of the faculty of the State Normal College, Dillon, Montana, and holds a full professorship in the college. His position is a dual one. He is director of teacher training in the college, and since the public schools of the city are the training school for the college he is also superintendent of the city schools. His position gives opportunity for a very comprehensive study of questions concerning teacher training.

In the *English Journal* for September there is an article on "The Evaluation of the Dalton Plan" by Miss Marion Sheridan, president of the Connecticut Teachers College Club and a member-at-large of the Teachers College Alumni Association.

R. M. Mosher (Ph.D. 1926), director of training at the State Normal School, New Haven, Conn., and lecturer on educational psychology at Yale University, is making an extensive study of the look-and-say *versus* the phonetic method in teaching beginning reading. During the present school year two groups, comprising a total of two hundred and fifty children, will be involved in this experiment.

The following alumnae have joined the faculty of the State Normal School of New Haven: Miss Marjorie Hays (Student 1918-19)—English; Miss Clara Scranton (B.S. 1926)—Art; Miss Frances Foley (B.S. 1926)—director of physical education and teacher of hygiene; Miss Nora Zink (A.M. 1926)—geography.

Margaret Carrington (A.M. 1922) has resigned her position as supervisor of medical nursing in the New Haven Hospital and instructor in the Yale School of Nursing, to become the superintendent of nurses of the Miami Valley Hospital School of Nursing in Dayton, O.

Blanche Graves (B.S. 1925) has resigned her position as supervisor of obstetrics in the New Haven Hospital and instructor in the Yale School of Nursing to become the supervisor of the Private Patients Pavilion of the Michael Reese Hospital, Chicago, Ill.

Anne Gibson Moffett (B.S. 1916) is keeping house for her husband and two boys. She is interested in the City Dispensary, Central School of Nursing, Junior League Day Nursery, Community Chest, and Council of Social Agencies in Utica, N. Y.

Florence L. Gould, formerly on the Teachers College library staff and on Dr. Bruner's research staff, is now head of department of education, junior college section, and instructor in sociology, Lasell Seminary, Auburndale, Mass.

During the summer session G. J. Borst (A.M. 1921) was professor of education in Teachers College, Syracuse University, where he gave advanced courses, primarily for graduate students, in educational administration and educational statistics. He is retaining his position as professor of education, and director of the School of Secretarial Science in Skidmore College during the regular college year.

Oren E. Long (M.A. 1924), is deputy commissioner of education in Hawaii.

## ALUMNI APPOINTMENTS

The following positions have been reported by the Bureau of Educational Service, Teachers College:

Abbott, Carol—Teacher of history, public schools, Palisades Park, N. J.

Addison, Charlotte—Chief dietitian, Western Pennsylvania Hospital, Pittsburgh, Pa.

Aden, Frederic E.—Vocational counselor, University of Colorado, Boulder, Colo.

Albert, Mary C.—Junior teacher, Ely School for Girls, Greenwich, Conn.

Alexander, Nelle S.—Instructor in department of education, University of Vermont, Burlington, Vt.

Allen, Clara M.—Instructor in English, Greensboro High School, Greensboro, N. C.

Allen, Margaret F.—Part-time instructor in kindergarten education, Teachers College, New York, N. Y.

Allison, Eli—Instructor in mathematics and science, Franklin School, New York, N. Y.

Allison, John R.—Instructor in mathematics and Latin, Springdale High School, Springdale, Pa.

Allison, Margaret McC.—Head of Spanish department, Henderson-Brown College, Arkadelphia, Ark.

Arbogast, Gertrude—Head of home economics department, Troy High School, Troy, N. Y.

Armstrong, Mary H.—Head of English department, Pearl River High School, Pearl River, N. Y.

Atwater, William G.—Teacher of Latin, Lawrence Academy, Groton, Mass.

Baer, Joseph A.—Research assistant, Ohio State University, Columbus, O.

Bailey, Grace D.—Critic of first grade, Lincoln Consolidated School, Ypsilanti, Mich.

Baldwin, Robert Dodge—President of Central Wisconsin State Teachers College, Stevens Point, Wis.

Barnum, Kittie M.—Teacher of music, De Witt Clinton, No. 9 School, Mt. Vernon, N. Y.

Barske, Charlotte—Director of the Aurora Sun School, East Aurora, N. Y.

Bartlett, Lester—Director of research, the Y. M. C. A. College, Chicago, Ill.

Batt, Velva—Teacher of English, Lyons High School, Lyons, Ind.

Bechtel, Helen W.—Director of measurement and supervision, State Department, Hartford, Conn.

Blumenfeld, Zipora—Teacher of physical education, Ethical Culture School, New York, N. Y.

Boehm, Charles H.—Supervising principal, Northampton Township, Richboro, Bucks Co., Pa.

Borgeson, Gertrude Preische—Nutritionist, Child Welfare Institute, Teachers College, New York, N. Y.

Bowe, Forrest B.—Teacher of French, Spanish and Latin, New Rochelle High School, New Rochelle, N. Y.

Boyd, Paul B.— Superintendent of schools, Carrollton, Ky.

Boydston, May E.—Instructor in education and psychology, St. Joseph Junior College, Ottumwa, Ia.

Brady, Agnes—Associate professor of clothing, Southwestern Louisiana Institute, Lafayette, La.

Bridge, Edna B.—Teacher of fourth grade, Lincoln School of Teachers College, New York, N. Y.

Brown, J. Stanley—Principal of continuation school, American Telephone and Telegraph Company, New York, N. Y.

Burns, Gertrude—Head of nursery school department, Temple University, Philadelphia, Pa.

Byer, F. J.—Teacher of public speaking and English, Southern State Normal School, Springfield, S. D.

Carl, Flora Lee—Home demonstration agent, Lumberton, N. C.

Carnahan, Juliet—Primary teacher, Primary School, West Hartford, Conn.

Coleman, Maybelle—Head of social science department, Lander College, Greenwood, S. C.

Cook, Florence—Teacher of history, Miss Mason's School, Tarrytown, N. Y.

Cook, Stella M.—Teacher of science, Glendale College, Glendale, O.

Cooper, Mrs. Olive—Instructor in home economics, Scarborough School, Scarborough, N. Y.

Counts, Beatrice S.—Instructor in nutrition, University of Minnesota, St. Paul, Minn.

Craighill, Eleanor R.—Instructor in art, State Normal School, Clarion, Pa.

Cummins, Albert S.—Principal of high school, Huddleston, Va.

Dale, Jane Elizabeth—Assistant professor of home economics, University of California, Southern Branch, Los Angeles, Calif.

Davis, Maude M.—Instructor in methods of teaching, teachers' training class, Public Schools, Greenport, Long Island, N. Y.

Davis, Sudie P.—Teacher of mathematics and French, Bradford Academy, Bradford, Mass.

Deaton, Mary B.—Teacher of freshman English, State Teachers College, Superior, Wis.

Dice, Latimer A.—Teacher of mathematics, Forest Park Senior High School, Baltimore, Md.

Dyer, Esther M.—Nutritionist, Proctor, Vt.

Edwards, Agnes E.—Teacher of Latin, Sunset High School, Dallas Texas.

Elftman, Robert A.—Library assistant, University of California Library, Berkeley, Calif.

Ellenwood, Laura C.—Nutrition worker, Inter-State Dairy Council, Philadelphia, Pa.

Elliott, May Burton—Teacher of history, junior high school, Ann Arbor, Mich.

Emerson, Margot—Director of nursery school, Community School, New Canaan, Conn.

Esten, Richard Stewart—Superintendent of schools, Litchfield, Conn.

Evans, Ruth E.—Research assistant, Institute of Child Welfare Research, Teachers College, New York, N. Y.

Everett, Marcia A.—Teacher with special work in curriculum construction, Teachers College Experimental Rural School, Allamuchy, N. J.

Fanning, George I.—Teacher of French, St. Francis High School, Brooklyn, N. Y.

Fassler, Yvonne—Assistant in physical education, Winthrop College, Rock Hill, S. C.

Figg, Ola Logan—Associate professor of Spanish, Tusculum College, Greeneville, Tenn.

Fink, Chlo—Instructor in English, Synodical College, Fulton, Mo.

Fox, Helen B.—Teacher of science, Ensley High School, Ensley, Ala.

Fredrickson, Alice—Critic teacher in lower primary grades, State Teachers College, Bemidji, Minn.

Fritch, Helen R.—Director of physical education, Martha Washington College, Abingdon, Va.

Gardner, Frances A.—Teacher of Latin,

El Dorado High School, El Dorado, Ark.

Garrett, Jeannette—Teacher of mathematics, Elba High School, Elba, Ala.

Gehrke, Charlotte—Instructor in domestic art, School of Industrial Art, Philadelphia, Pa.

Godsey, Edith R.—Teacher of Latin, McKinley High School, Washington, D. C.

Goeltz, Julia—Teacher of mathematics, Long Beach High School, Long Beach, N. Y.

Gordon, Dudley—Instructor in history, Scarborough School, Scarborough, N. Y.

Gordon, Kathryn E.—Instructor in mathematics, Junior High School, Irvington, N. J.

Gorham, Lee Summer—Educational director, Rectory School, Pomfret, Conn.

Grady, Thelma—Assistant in educational psychology, Teachers College, New York, N. Y.

Greene, Katharine Bradford — Psychological research worker, Bureau of Educational Experiments, New York, N. Y.

Greer, Edith G.—Teacher of first grade, Hanahauoli School, Honolulu, T. H.

Hadley, John C.—Supervisor of rural education, Millersville Normal School, Millersville, Pa.

Haines, Martha—Assistant supervisor of home economics, University of Vermont, Burlington, Vt.

Haynes, William Henry—Director of boys' work, Archdeaconry of Boston, Protestant Episcopal Church, Boston, Mass.

Hays, Emily—Instructor in home management, University of Arkansas, Fayetteville, Ark.

Henley, Clara B.—Assistant supervisor of music, Knoxville City Schools, Knoxville, Tenn.

Higginbotham, Lorine—Teacher of history and social science, Dallas High School, Dallas, Tex.

Hill, Charles W.—Teacher of physics, Carl Schurz High School, Chicago, Ill.

Hill, Temple—Instructor in history, training, Junior High School, Kansas State Teachers College, Pittsburg, Kan.

Hoey, Julia E.—Teacher of physical education, Sacred Heart Academy, St. Louis, Mo.

Hovey, Ruth—Associate secretary for women's work, Y. M. C. A., Montclair, N. J.

Hurlin, Marshall W.—Teacher of science and French, Junior High School, South Norwalk, Conn.

Hyson, R. S.—Principal of Senior High School, Randallstown, Md.

Ireland, Henry M.—Instructor in economics, Rhode Island State College, Kingston, R. I.

Jammer, George F.—Superintendent of Schools, Wellsville, N. Y.

Jensen, Emma B.—Teacher of domestic science, Scott High School, Toledo, O.

Jerolaman, Vera N.—Teacher of commercial subjects, Park Ridge High School, Park Ridge, N. J.

Johnson, Myra I.—Teacher of mathematics and science, Blackstone College, Blackstone, Va.

Kehl, Dorothy E.—Teacher of Spanish, Clifton High School, Clifton, N. J.

Keller, Harold W.—Head of history department, Pennington School for Boys, Pennington, N. J.

Keener, Myrtle E.—Instructor in English, Kemmerer Senior High School, Kemmerer, Wy.

Keithan, Elizabeth F.—Teacher of Geography and writing, State Normal School, Clarion, Pa.

Kizer, Charlotte—Supervisor of art, Public Schools, Lincoln, Neb.

Knapp, Frances—Teacher of French, Grant High School, Portland, Ore.

Lee, Helen B.—Instructor in English, Drury High School, North Adams, Mass.

Lette, Bertina A.—Cafeteria director and dietitian, East High School, Youngstown, O.

Lester, Myrtle D.—Teacher in nursery school, New Orleans, La.

Lewis, Marjorie—Manager of cafeteria, high school, Tenafly, N. J.

Larson, Emil L.—Assistant professor of education, University of Arizona, Tucson, Ariz.

Lieber, Charles C.—Director of vocational guidance and supervisor of junior high school, public schools, Port Arthur, Tex.

Lindsay, William T.—Director of physical education, Bedford Junior High School, Westport, Conn.

Livingston, Jeanette Lee—Teacher of junior high school English and history, Lafayette School, Highland Park, N. J.

Long, Edward L.—Teacher of physics, Yonkers High School, Yonkers, N. Y.

Losier, Etta M.—Head of home economics department, Edmundston Composite School, Edmundston, N. B., Can.

Losing, Ethel M.—Assistant in physical training, James Madison High School, Brooklyn, N. Y.

*Continued in January Number*